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The Sir Charles Clubbe Memorial Oration.¹

By SIR ROBERT WADE,
Sydney.

I SHOULD like to thank the Board of Management of the Royal Alexandra Hospital for Children for the honour they have done me tonight in commissioning me to deliver this, the third address, in honour of the late Sir Charles Clubbe. Not only is it an honour to do this in the case of a man like Clubbe, who did so much for the country of his adoption, but it is an added privilege to myself, for I am one of the last of the generation that knew him well; he was my old chief, whom in many respects I succeeded, and he was a man for whom I had a profound admiration, coupled with a close personal friendship.

Sir Charles Clubbe.

Charles Percy Barlee Clubbe was born in 1854 in Buckinghamshire; he was the son of an Anglican clergyman, and in the earlier part of his life he lived at Hughenden where he came into close connexion with Disraeli, Lord Beaconsfield, who lived in the same village. His father was the Reverend Charles Clubbe, rector of the parish of Hughenden; his name is mentioned in some of the biographies of Disraeli. His mother's name was Barlee—she was one of (even for those days) a prolific family of nineteen. One of her brothers—Clubbe's uncle, Sir Frederick Barlee—was for twenty-three years Colonial Secretary for Western Australia, then a Crown colony, and later Governor of British Honduras, where he died. Another brother was knighted for his services as a justice of the Supreme Court of Bombay.

Charles Clubbe was educated at Uppingham School and received his medical training at Saint Bartholomew's Hospital, obtaining the diploma of membership of the Royal College of Surgeons in 1876 and the licentiate of the Royal College of Physicians in 1877. He was resident medical officer at Kidderminster Hospital in 1877, and then went for a time to Natal to serve in the 1879 Zulu War. When he arrived the campaign was completed, and after staying for a short while, acting as civil surgeon at an army depot, he returned home. On his arrival back, he became chief resident medical officer at the Manchester Children's Hospital, working under Ashby and Wright, whose text-book on diseases of children was for many years a standard in English medical literature. It was from this connexion that his interest in diseases of children originated—an interest that was to lead him to the forefront in the medical history of Australia in that particular line of work. He was in practice in London for a short while, and then, owing to illness—it was, I fancy, a lung condition—he emigrated to this country.

Clubbe arrived in Australia in 1883, at the age of twenty-nine years, and started in private practice at Randwick, a district that in those days had to be covered on horseback, and extended from Watson's Bay to La Perouse. While there, he attained positions on the honorary staffs of the then Prince Alfred Hospital and the Sydney Children's Hospital at Glebe Point. He later acquired rooms in Macquarie Street, and gradually relinquished his suburban practice and worked there as a general surgeon and as a children's specialist.

Clubbe held many posts of responsibility; he was in charge of the baby health centres at their inception, but resigned soon after, when he found that his recommendations were being ignored by the then Minister for Health, and that centres were being installed rather as a result of political pull than as an economic necessity. He was well known to the public of this State for his work among

¹ Delivered at the University of Sydney on April 27, 1945.

children, and he was the sole well-known paediatrician of his time.

As a surgeon, imbued from the Manchester days with a knowledge and love of work among children, he introduced new methods and new points of view when he arrived in Sydney, and by his treatment of congenital deformities, especially club-foot, he may in truth be said to be the father of all orthopaedic surgery in the State—although I doubt whether he would be pleased if he were to know how the work of the present-day orthopaedic surgeon has changed from the original meaning of orthopaedic (namely, to make the child grow straight).

Clubbe was widely read and up to date, and in his general work was valued by his colleagues for his opinions on urgent and difficult abdominal conditions. He was best known as a surgeon for his work in intussusception—that is, a telescoping of one part of the bowel into another, causing early death by intestinal obstruction; this is a condition commonly found to happen suddenly in healthy babies under one year of age. He achieved world-wide recognition of his work, in that in this affection he standardized the early diagnosis and treatment and reduced the large mortality rate (over 80%) to less than 12%. Though the work was done some forty years ago, it has remained as standard and has not been improved upon up to the present.

The Sydney Children's Hospital was established in 1879, and did not take long before it began to undergo its teething troubles. As far as one may read, they were largely due to a matron who wished to be paramount in everything, and as a result the honorary medical staff resigned. Finally, four other medical men—Professor Anderson Stuart and Dr. Clubbe, Dr. Lovell and Dr. Scot Skirving—were asked to fill the breach. Soon after their appointment, the same trouble recurred; there was considerable Press publicity and public meetings were held. It culminated in 1889 in a magisterial inquiry. Charges were laid by the matron that the medical staff did not attend when summoned to urgent cases, and that one of them had sworn at a nurse who had called to ask him to go urgently to the hospital. It must be explained that at this time there was no resident medical officer at the hospital, and that both telephone and tram communications were difficult and scanty, so that if a medical man was needed in a hurry, a nurse had to be sent by hansom cab to summon him whenever and wherever she might be able to find him. The inquiry into non-attendance soon fizzled out; the charges were disproved and the medical staff was completely exonerated.

The medical man accused of profanity was, at that time, somewhat given to occasional picturesque imagery in his language—reminiscent, perhaps, of a sea training in an earlier part of his career. All were agog in the court. The nurse refused to repeat what had been said. It was too dreadful, she stated. She would not write it. Finally, taking a deep breath, she took the plunge—in an awed whisper she deposed that he had used the word "damn", and the ice broken, she revealed that it was even worse than that—he had used the awful word twice! The court dissolved. Poor Victorian dear, had she only had the privilege of hearing him in uncramped surroundings! This particular medical man even today looks back on the whole affair with unchanged satisfaction, because he feels that it is one of the good deeds of his life, in that he helped in some way to free the hospital from an existing canker, and so assisted in the inauguration of a new management which has resulted in the great institution of today.

Another of Clubbe's interests was diphtheria. In those days these patients were housed in an annex across the street from the main hospital at Glebe. Clubbe used to tell the story of the first use of diphtheria antitoxin in this State. A call came from the Board of Health that they had received a stock of this new means of treatment and would he care to use it at the diphtheria cottage? He agreed, but in the absence of all knowledge of it, extraordinary care was taken in safeguarding the hospital. It was only after due explanation to the parents of the unknown quantity and the experimental nature of the

method that the treatment was used. A statement signed by the parents absolving the hospital from responsibility from untoward results was obtained. As is well known, the results were so wonderful that it is now the standard treatment.

In all, as a surgeon and particularly as a children's surgeon, Clubbe has left his mark on the medical community and set up in it a standard for work that remains up to the present. He was adored by his house surgeons for his lovable, equable nature, for his prompt attendance at hospital in times of emergency, and for his help in establishing them as efficient medical men, trained to do the routine surgical work that comes the general practitioner's way. We used to think it was generosity when he helped us to do "bread-and-butter surgery", but it was more—it was, he thought, the duty of the honorary surgeon to teach his house surgeon, and in this he was unique in his day.

As a consultant at the Prince Henry Hospital, at that time called the Coast Hospital, under government management, he used to attend regularly once a week to do any surgical work needing special experience, but mainly to assist the house surgeons in what was up to that time the only attempt at post-graduate teaching in surgery, and it was on that ground that he undertook the work.

After a visit to Australia by officers of the American College of Surgeons, that College offered Clubbe the honour of Honorary Fellowship, and realizing the honour, he gladly accepted it.

The Children's Hospital was Clubbe's main interest in life, as an administrator. He saw it grow and helped in its growth from an old building capable of holding thirty patients to an up-to-date hospital of 400 beds. He joined the staff in 1884 and remained, first as honorary surgeon and later as honorary consulting surgeon, until his death in 1932. He became a member of the board in 1884 and chairman of the board in 1904.

The story is told that when funds were "totted up" after the land was bought for the new hospital at Camperdown, the building fund was some £15,000 short. The board, against Clubbe's view, decided to postpone the building until all the money was in hand or at least in sight. Whereupon he gave his personal guarantee for the amount required. The building was begun and his faith in the public generosity was justified, for finally the full amount necessary was subscribed. Under his guidance, the many difficulties inevitable in the management of a large new undertaking were surmounted and steady progress was made. The hospital remained his one great medical love and preoccupation until his death, at which time he was still active as chairman of the board.

Clubbe took a considerable part in other interests of a public nature—baby welfare, district nursing, the British Medical Association, the Royal Australasian College of Surgeons, bush nursing *et cetera*; but it was the Children's Hospital to which he devoted all his loyalty. In 1927, as a recognition of his place as an outstanding surgeon and of his work in the public interest, especially at the hospital, he was created by His Majesty the King a Knight of the Most Excellent Order of the British Empire—an honour much appreciated by his many friends and admirers and by the medical profession.

As a man, Clubbe was admired and loved by all with whom he came in close contact. Never seeking limelight, always imperturbable and apparently easy-going, he contrived that everything with which he was concerned was carried out as he wished. At times stirred out of his calm and apparent phlegm by some story of injustice, he would wax wroth and become very outspoken and would fight keenly for what he considered a principle. An example of his kindly generosity was seen when a child, after a tracheotomy for laryngeal diphtheria, was, as happened every now and then, unable permanently to discard the tube. In these cases the tube can be removed only for a few minutes or at most hours, when a spasm may recur and suffocation is threatened unless the tube is immediately replaced. Success is attained only by much patience and careful watchfulness in removing the tube for longer and

longer periods until it can be finally left out. In this case, Clubbe took the mother and child into his own home, and personally cared for the child for some months until it was well.

Clubbe was reliable; he was always punctual in keeping appointments, his interest in his work was intense, and he, of the honorary staff of my day, was the one above all who could be relied upon to answer a call to the hospital, however inconvenient or difficult the circumstances. He was independent and went his own course irrespective of opposition, and asked no help; once he was satisfied that his way was right, he went through with it.

Though he had given up actual practice for some years, he continued his work as president of the hospital until his death.

... let me not live

After my flame lacks oil, to be the snuff
of younger spirits. . . .

These words are a prayer that might well have been his.

Asking nothing, giving all he had, seeking no reward or praise, he was an example of what a public-spirited man, holding high office should be.

Child Health: A Scheme for the Future.

As Sir Charles Clubbe's main interest in life was concerned with pædiatrics—that is, the diseases of children—and so especially with the Royal Alexandra Hospital for Children, and as I have had the same interests, I have taken for the subject of my address tonight that of child health, and have tried to envisage what part our hospital will play in such a scheme.

We are being awakened as a public to the need for something to be done to improve both the social welfare and the general health of our people. Members of parliament are, as a result of public opinion, becoming aware of this, and we are being overwhelmed with talks of free medicine, free hospital treatment and free medical attention. With the principle of these I have no quarrel; but I would submit that those who govern us have put the cart before the horse in placing the importance of the cure of disease, after it has been engendered, before that of ensuring a state of general good health which would prevent the occurrence of disease. Better a fence at the top of the precipice than an ambulance at its foot.

I should like to visualize with you a scheme of "positive health" from birth onwards and the part an institution such as the Royal Alexandra Hospital for Children might play in it.

The proposition that in order to breed up a healthy adult it is necessary to safeguard the child's life and nutrition from birth or even earlier should be self-evident; but I stress it by quoting well-known eminent authorities. Sir William Beveridge has said that "the foundations of a healthy life must be laid down in childhood"; and Lord Dawson of Penn has said that "the care of child health should take precedence over almost everything else at the present moment". The Goodenough Report on Medical Schools states:

... in most medical schools the attention paid to social medicine, the promotion of health, and the prevention of disease is often perfunctory and largely divorced from the rest of the student's training. If medical students are to be fitted to become health advisers and members of a National Health Service, the ideas of social medicine must permeate the whole of medical education. A new orientation of medical education, a big expansion of the social work of teaching hospitals and radical changes in the outlook and methods of most of the teachers are involved. To safeguard its own future, the nation will have to improve its provision for the welfare of children. These improvements will extend beyond the immediate sphere of medicine, but medical practitioners will have to play a leading part in raising the health of the children to the highest possible level.

Generally in the medical schools, the teaching about children has been inadequate and only faint interest has been taken in the subject. The deficiencies have been most serious in respect of child health and normal development.

In other words this means that there must be a complete scheme of preventive medicine in which child health and welfare play the principal part, if we wish to achieve what our various political committees are calling a state of "positive health".

The principles to be observed in such a scheme are well known to the medical profession, but have never been carried out in the mass. I presume the term "positive health" can only mean the health of the people as a whole; if so, it involves extremely large expenditure—a matter of millions for Australia. But it will be largely alternative to, not additional to, the enormous sums now involved in diagnosis, treatment and convalescence of sickness among the public. In discussing the question of "positive health", I shall confine my remarks to methods affecting the child at various ages. I recognize quite clearly that any such project is not, in itself, a panacea for all human ills, but must occupy a position secondary to measures designed to ensure a healthy community.

The Essentials of a Child Health Scheme.

The all-important factors in any health scheme are: (i) adequate subsistence for all; (ii) ample supplies of suitable food at prices possible to everyone; (iii) slum clearance and the building of sanitary houses for all.

The health services in all stages of child life consist of advice on "nutrition and healthy upbringing of the child, periodical medical and dental examination, and the remedying of any defects found. Abnormal conditions, whether caused by disease, malnutrition or bad posture, should be referred to the proper agencies to deal with them. A follow-up system should be in operation, and check on the progress of the child should be carried out at regular intervals and prevention or amelioration of all these ills ensured.

Any comprehensive programme of "positive" public health must, to be even tolerably effective, commence with the first evidences of pregnancy. To leave the vital prenatal months either to chance or to take care of themselves is to waste a golden opportunity to give the child that good start which is half the race. To plan the future of a child at birth may well prove too late. It is worse still to postpone his medical care and supervision until unmistakable evidences of physical defect or serious ill-health force themselves upon the notice of an inexperienced mother.

The needs of a scheme for child welfare are straightforward: the proper food for expectant mothers and their supervision in pre-maternity clinics, their proper care and treatment in childbirth, and supervision by a pædiatrist for such time as the baby is still in the obstetric hospital. This will ensure, in the main, that the baby is brought into the world in as healthy a condition as may be.

During the period from birth to two years, the child can perhaps best be cared for by a considerable extension of the baby health centres to localities not now served. The splendid work of these centres is progressing and being expanded, to the lasting benefit of society. There is perhaps but one criticism which can properly be made: there are not yet nearly enough centres adequately to serve all the mothers in need of guidance, counsel and advice, nor is there sufficient trained staff. But the work has a cumulative effect; when a young mother has reared her baby in strict accordance with the precept and example of trained experts, she will, perhaps unwittingly, have acquired habits and skill and a technique which will smooth the path for subsequent babies. She will, too, have learnt short cuts and a simplified procedure, which, eliminating drudgery, thereby removes one deterrent to larger families. But people in the country, especially in outlying districts, are still unable to take advantage of these methods for their babies; with more money and a little more time, we may be sure that a complete scheme may be developed by those in charge of the baby health centres.

The period from two to five years, the so-called pre-school age, is one of the most important periods of the individual's existence. Now is the time when the child,

previously protected in some measure by antibodies in the mother's milk, comes into contact with the various infectious diseases, and must manufacture its own protection from influenza, measles, whooping cough, diphtheria, scarlet fever, infantile paralysis *et cetera*. Many of the infectious fevers are the precursors of respiratory troubles that lead to much subsequent ill health. Immunization against some of these (later it will be against all) should at this stage be completed; all those who were missed for some cause or other during the stage of babyhood should be given the chance of protection.

This problem of immunization, every time it is discussed, raises a question that sooner or later must be answered finally and unequivocally: To what degree are individual rights to have the ascendancy over the rights of the community? When they are incompatible, which shall prevail? Can the individual be allowed to exercise a right to refuse immunization to his children, thereby exposing not only them but children of his neighbours to infection, disease, and perhaps death? These are questions of right, of duty, of obligation. There is abundant precedent for compulsory protection. Parents may not, under penalties prescribed by law, deny their children education; some diseases are notifiable; isolation of the patient and contacts is compulsory. All this is perfectly sound democracy.

The greatest praise is due to the Kindergarten Union and to the Day Nurseries Association for the wonderful work undertaken by them on behalf of children at that stage of life which they have accepted as their special responsibility. They have been the pioneers and have devised an excellent programme, but have been sadly hampered by lack of funds. What numbers they are able to look after now with augmented government funds I cannot say, but some little while ago they were able to care for only 2,000 out of an estimated number of 165,000 children of pre-school age in the State. These bodies look after pre-school children and train them in elementary hygiene and in behaviour, and begin their early education; they act as a training body to parents who are, or can be, interested in the upbringing and management of young children.

Child guidance clinics are necessary in all stages of child life, to analyse the problems of the child who is proving in some way or other difficult to manage—the rebel, the problem child, *et cetera*—and to differentiate these children into their respective classes—the abnormal children with some unhappy inheritance who are the potential criminals, and those who are only rebels against authority. These children, if uncared for, may be potential gangsters or leaders in life, according altogether to the way in which they are handled. The last-mentioned children start off early in life as disobedient children, since the parents who do not know how to handle them often tend to antagonize them, and the opposition complex is easily aroused in youth. It is in this class that child guidance clinics could be more properly termed parents' guidance clinics, for it is a matter of teaching the parents rather than the children how to behave. Bringing up of children is not, as is generally supposed, a natural gift that all parents possess, but it has to be learnt at present in the hard school of experience—unnecessarily hard, both for the parent and for the children; much of it might be obviated if a period of education in child welfare was interpolated in the later years of the curriculum for girls at school.

However, the most important period of all in the child's life, when child guidance clinics should be available, is that from birth to two years; it is so far untouched ground, for it is then that the seeds of trouble are sown owing to lack of knowledge on the mother's part of the management and guidance of her baby's everyday life.

Trouble always starts with difficulty in inducing the baby to take its food or sleep at regular hours, and the story is time and time again seen to run as follows. The baby is often taken off the breast because he is not thriving, the worried mother is no longer able to provide the full amount of food, and the seeds of trouble in feeding are

sown. Later, the story is that the child refuses his meals, the fond mother coaxes, implores, scolds and punishes, and finally ends in a fit of weeping herself. The child senses that he has won the battle, and soon appreciates that no one can make him take his food if he does not wish to do so, and he soon learns that if necessary he can, as a last recourse, vomit what he has taken. The child finds that there are two things no one can force him to do—take his food or go to sleep. Thence the steps in disobedience and rebellion are easy, and so your problem child develops.

It is at this age, then, that child guidance clinics should be used freely, and help should be given to the errant infant to take the right track, or, as is generally necessary, he should be saved from his parents, maiden aunts and grandmothers.

However, I would stress that the health of the child should be the paramount interest. The least that we owe children is proper medical supervision, sound nutrition, sanitary housing and such immunization against disease as is practicable.

We come next to the school age—from five years onwards. Here we have a school medical service attached to the Department of Public Instruction. Whether this provides a better cover than would be possible were the scheme sponsored and managed by the Department of Public Health, is a question that it would be a digression to discuss here. Without criticism of this school health service, looked after and controlled by earnest and enthusiastic heads—not, unfortunately, in control of the public purse—I venture to say that they would agree with me that infinitely better work would be possible were more funds available.

During this school age, care of the teeth and of posture, and correction of defects, are of particular importance. Supervision of nutrition, exercise and physical development, sport and recreation, are all means to an end. Too many children still run wild in the streets; too many from sheer boredom seek relief in the mischief and minor delinquency which are the thin end of the wedge that opens the way to a life of crime.

If I might write a prescription in a field which is not my own, I would suggest the obvious remedies for older children: more swimming pools, more parks, more playgrounds, gymnasia, recreational centres for occupational amusement, for hobbies, for reading and for study, all under trained supervision and guidance.

While speaking of the period of school education, I am tempted to diverge from my main theme into what is perhaps not properly my business, and stress the need for girls to be taught such basic subjects as simple biology, elementary hygiene, practical housekeeping, the care of infants, domestic science and first aid. The average girl, having qualified for the Intermediate or Leaving Certificate, is still lamentably ill-equipped to discharge the responsibilities of housewife and mother.

At the end of school years, if I had my way, I should like in one respect to copy the Germans—for dislike their culture and their methods as we may, at least there are some good ideas we can use. One is, I think, a year's work after school age for both sexes—a year in the country, with labour or drill, under discipline, a hardening and tempering of both mind and body.

I think it is obvious that any scheme of child health and welfare large enough to allow every individual access to it, should be so wish, will be costly—so much so that it will probably be quite out of the reach of any organization financed wholly by voluntary subscriptions. The baby health centres already cost £60,000 *per annum* for upkeep and are restricted to the babies in the State. The clinic buildings are, in many cases, quite unsuitable, inadequate and obsolete. As it costs £2,000 for each properly designed building for a baby health centre, at least a quarter of a million pounds is needed annually for a time to cover the costs of building and the running expenses of increased trained staff. In addition, crèches must be instituted to help the mother by caring for the children while she is at work, or shopping, or having, at times, a well-earned day off.

The Kindergarten Union and Day Nurseries Association, so far, have been able only, even with increased funds, to cope with at most some 4,000 of the 165,000 children needing their help. The cost of nursery school buildings to cope with 100 children is estimated at £5,000, and with an annual upkeep of £2,500. The school medical service costs at present under £50,000 *per annum*. No capital expenditure for building is required, but the annual investment could well be doubled and still not attain a complete regular "follow-up" examination.

Organization of the Scheme.

Such a scheme will obviously cost a great deal of money—so much so that I cannot see it being financed in other ways than by the Government, and if the Government has to finance it, it will obviously wish to control it. I would rather see the scheme under the charge of an institute controlled by interested citizens chosen for their special knowledge of the problems involved. The figures I have given do not cover all costs; if such a scheme is to be successful, it must depend on a trained staff, and this will involve the expense of training and the payment of a trained, certificated body of workers. I would postulate that if such an institute or government department were to be introduced, there would be three essentials: (i) that all members of the staff be properly trained in their various classes of work; (ii) that the scheme be absorbed gradually into a planned five-year or ten-year programme; (iii) that the health portion of the scheme be treated as the dominant factor—the others accessory.

To implement such a scheme, I would suggest that it be carried out by two general services, (i) governmental and (ii) university. With regard to the governmental aspect, a child health department should be established as a branch of the Department of Public Health and under the control of skilled interested citizens. With regard to the university aspect, a chair of child health and paediatrics should be established at the university for research, guidance and reference, for the training of personnel and for coordination of child health matters through a knowledge of study of diseases of children. (This chair is not new; such chairs have already been established at the Universities of Glasgow, Edinburgh and Birmingham, and are serving in those places a very useful function.)

All medical personnel of all ages attached to such departments should have special training in paediatrics, for it is only by a knowledge of children's diseases that their care and prevention can be understood. There should be (as is already provided by the combined Royal Colleges of Physicians and Surgeons in England) a diploma in child health, and only those possessing this should be given positions in the service. Similarly, all nurses employed should hold special certificates in the nursing of children and babies. Special training is needed in all forms of social service—hospital social service (almoners), psychological service, general social service *et cetera*. Those with special training should hold special certificates or diplomas and have the right to recognition and registration in their particular speciality. As the work of such a scheme cannot be allowed to become stagnant, there must be added to it opportunities for post-graduate work, for refresher courses and for higher diplomas and qualifications; this is one of the reasons why a chair of child health should be established, for it is under its guidance, at the university, that the training in the various services can best be coordinated.

It will be asked what part a hospital, a place for the treatment of sick children, can possibly play in such a scheme of prevention of illness. The hospital's part can and must be large; it must act as a clinical school for the training of staff and for research in the prevention of disease. The days are past when hospitals were merely for the treatment of the sick, and they have already merged—at least, many of them have—into teaching hospitals for students; all of them are training schools for nurses. The hospitals, particularly the teaching hospitals, must emerge still further, and take a larger and ever larger responsibility for the general health of the community.

The Royal Alexandra Hospital for Children, apart from caring for sick children, is already a teaching school for

students, and in post-graduate medicine, and a training school for nurses, and is responsible for the training of students of speech therapy and orthoptics. A school for crippled children is established on the premises, and we take our part in a general scheme for the training of X-ray and pathological technicians, and of those studying physical therapy and occupational therapy, and the hospital must, in time, be a centre for the training of all connected with the care of children.

Quite recently, the Royal College of Physicians of London presented a report on medical education. In one paragraph, headed "The Place of the Teaching Hospital in an Organised Medical Scheme", the following statement is made:

In the past, Teaching Hospitals have been founded and financed for the treatment of the sick. Teaching and research have been, as it were, sidelines to which relatively small parts of the Hospital space, equipment and thought have been devoted. The Committee considers that the position of the Teaching Hospitals as centres of education and research requires greater recognition and a much increased contribution from the public purse. For this campaign against disease is ultimately dependent on the progress of medical knowledge and on the efficiency of the medical profession, both of them derived largely from the Teaching Hospitals.

What is the part of the Royal Alexandra Hospital for Children, then, in this respect? It is already recognized by the University of Sydney as its teaching hospital for diseases of children. I only regret that at present it is not used as much as it might be, and that the course in paediatrics for medical students is too short and incomplete.

In view of its importance to the health of the community, I would plead that paediatrics be made a major subject. This movement again is not new; it is already in operation at the University of Birmingham, where paediatrics has been made a major subject, and I have reason to believe that it is a success. Let us hope that if and when a chair of child health and paediatrics is established, its professor will wield enough influence to ensure that the importance of these subjects in the curriculum is recognized.

Comment.

To recapitulate, it is necessary that all the servants of an institute of child health should have specialized training in their own particular work: the medical staff, a diploma of child health; the nursing staff, a diploma in baby and child nursing; the teachers, a diploma from the Kindergarten Union or the Day Nurseries Association; the instructors who will look after organized play, a diploma from the Board of Social Studies; the physical culture instructors, a certificate from the department of physical education at the University; psychologists, a diploma from the university; all these should be coordinated by the institute and chair of child health to work towards one end.

It has just been announced that the Trustees of the Nuffield Foundation have allocated £100,000 for a Chair of Child Health in the University of London, and that it is proposed to create a post-graduate Institute of Child Health. Full details of the proposed Institute are not available, but it has been stated that it will rank as a central teaching establishment of the University, with a building adjoining the existing hospital buildings at Great Ormond Street Children's Hospital, already largely reconstructed on modern lines. The Chairman of the Hospital has indicated the contemplated scope of the new Institute by naming the figure of £250,000 as the sum necessary for a suitable site and building. Here it would be possible to train workers in the field of child health, and by close association between the Institute and the Hospital, ensure a better co-operation between the medical and nursing personnel concerned in child care, both in health and disease, than has hitherto been achieved.

The Trustees consider the special problems likely to be studied at such an Institute may be the following:

(a) *Management of the Premature Baby*.—The death rate in the first month of life has not been reduced by anything like the same degree as the death rate in the first year. It has been estimated that about half the deaths in the first month are associated with premature

birth, and it is felt that a co-ordinated study should introduce means to save far more of these babies than at present.

(b) *Nutrition*.—Wartime necessity has greatly increased the available knowledge on nutrition, and such knowledge must be applied in detail to the needs of children.

(c) *Physiotherapy*.—Rehabilitation in childhood is at the beginning of a new and intensely interesting phase. Correct posture must be more carefully studied and remedial exercises given a better scientific background.

Under our present systems of hospitals, whether voluntary or government controlled, the great lack is finance for research into problems of health and sickness. Some hospitals have been lucky enough to receive donations from interested people; but, large though some have been, they have not been enough for the work that requires to be done. It is important that governments should set aside large, or rather, very large, sums for medical research, of which research into the health of children will eventually absorb a considerable share.

I find that in Russia funds are set aside for special research in children's health. They are for the following purposes: (i) studies of the peculiarities of the growing organism (morphology, physiology, psychology); (ii) children's diseases; (iii) neuropsychiatric diseases of children; (iv) hygienic organization of children's institutions; (v) activities—study and work of healthy and sick children; (vi) physical culture; (vii) social hygiene; (viii) development of the child in all its aspects. Further, Dr. F. M. Burnet, Director of the Walter and Eliza Hall Institute of Research in Pathology and Medicine, Melbourne, speaking of research, makes the following statement:

The second gap in the present organization in Victoria is the lack of active research in the field of paediatrics and child health. The understanding and successful guidance of childhood is probably more important to the community than any other aspect of medicine. In my own subject I am convinced of the necessity for much wider study of infection in childhood, if we are to gain a real understanding of the natural history of infectious diseases in man. I fancy that those interested in nutrition and in psychiatry may hold very similar views in regard to their subjects.

An institute of child health associated with the Children's Hospital and, perhaps, under the direction of the professor of paediatrics, might well be an early post-war objective. It should, however, have a considerably wider scope than that of a laboratory for clinical research in paediatrics.

When fully developed it should become a centre to which any childhood problem of current importance could be referred, whether of nutrition, infectious disease or behaviour.

Here are a few of the directions in which I consider research is needed: (a) the nutrition of children, and how far a deficiency or excess of certain vitamins and metals in their food affects their health; (b) aberrations of function of the internal glands during youth and their after-effects; (c) the manner in which, if necessary, these defects may be remedied. Research is necessary into various diseases peculiar to children, as, for instance, a disease common in Australia and discovered in Adelaide by Swift; the name it commonly bears is that of "pink disease", coined for it by the subject of this address, Sir Charles Clubbe.

Research should be carried out at the hospital into the architecture and design of children's hospitals and other hospitals for the young, with particular emphasis on the problem of cross-infection. The study of the air-conditioning of wards and its effect in relation to certain chest conditions is a promising field. All new drugs and methods of treatment should be evaluated by medical men working as teams, and findings should either be published in a special journal or communicated to medical publications and journals. The hospital should play its part in educating the public in matters of general health in respect of the upbringing of children, and should, through a journal of its own, be able to make pronouncements of value on all such questions.

Conclusion.

I fear that many of you will leave here with the impression that all I have said is wishful thinking—the pipe-dream of an enthusiast. I, myself, confess to a fear that, as in the past, much of it will be forgotten as soon as the war is over and our ordinary slack routine of peace is reestablished.

History has a habit of repeating itself. In the ruins of the Tower of Babel, a cuneiform library was brought to light devoted to the topic of a "brave new world". This was within the twenty-fourth century before Christ. Aristotle wrote an essay, now lost, entitled "*Neos áyathos κόσμος*", "The Good New Universe". During the Middle Ages, numerous writers discussed the possibilities of a "*novus mundus præstans*", "the world to come". At the present day, we have the Beveridge Plan and the Tomlinson Report, and every nation is prepared to put forward some new scheme of social security in a new world. Will these have any better fate than their forerunners? Well, let us hope so, and let us hope that the future holds something better.

I do not for a moment think that such a scheme for assuring "positive health" as I have outlined could be implemented by a stroke of the pen; such changes must be evolutionary. At the best, it would be only a planned movement, to be brought into operation over a period of years—the initial stages to be a government controlled child health department, and a chair of child health and paediatrics.

With the gradual training of a skilled, certificated staff, and with the gradual introduction of new units into the scheme, I feel that, according to present knowledge, I have just furnished to you the skeleton of a project that perhaps may some day be clothed with living tissues, energy and life. You will remember these lines:

If to do were as easy as to know what were good to do, chapels had been churches and poor men's cottages princes' palaces.

Could I but see the chair and the government department established, I believe that the rest would come in its own good time.

SCRUB TYPHUS: CLINICAL ASPECTS.

By C. B. SANGSTER,

Lieutenant-Colonel, Australian Army Medical Corps,

AND

H. B. KAY,

Major, Australian Army Medical Corps.

THE following communication is based on the clinical findings in a series of 235 cases of scrub typhus. They were encountered in the wards of an Australian general hospital stationed in a tropical zone during a period of eight months from October, 1943, to May, 1944, inclusive. No special reference will be made to the pathological, bacteriological or biochemical findings, as these are dealt with in a separate paper by Major V. J. McGovern, pathologist attached to the hospital. However, from time to time references will be made to his findings in relation to certain of the clinical aspects.

The series represents a true cross-section of the disease, for different patients were observed (a) from the time of their initial symptoms, (b) during the acute febrile course of their disease, and (c) in their immediate and later convalescent periods.

EPIDEMIOLOGY.

Scrub typhus was first described by Palm in 1878. No attempt is made here to review the literature, as this article is written from the field, and available references on the subject have been few.

The condition is known by various synonyms, of which *tsutsugamushi*, Japanese river fever, *mite-borne typhus*

fever and tropical typhus are the best known. It is endemic in Japan, the Federated Malay States, Sumatra, Java, Borneo, Formosa and Australia. In the last-mentioned country the disease is known as coastal (or Mossman) fever, and occurs in North Queensland.

Scrub typhus is one of the group of rickettsial diseases, and is the result of infection with a specific organism, the *Rickettsia orientalis*. The vector for this agent is the mite *Trombicula akamushi*, infection being transmitted to man by the bite of its larval form. The mite occurs especially in areas of virgin ground where the vegetation is dense, and in New Guinea particularly, in localities where kunai grass abounds. It is thought that certain native animals, probably mice, rats and bandicoots, act as reservoirs for the infection, the larval mite becoming infected through living on these animals.

These mites may become attached to anyone making his way through dense jungle or thick grass, and in biting may pass on the infection to the subject. It is thought that "mokka" bites, plentiful amongst troops in New Guinea, and especially occurring on the legs, are caused by these mites. Two additional points in the epidemiology may be mentioned. Once the larval mite has become infected, the *Rickettsia* are capable of being passed on indefinitely from adult to egg, to larva and finally to adult again, so that the cycle is completed. The other point is that the disease becomes endemic in certain areas, depending *inter alia* on the prevalence of those animals which may act as reservoirs, on the number of people in the area, and on the natural features of the area—namely, the type of vegetation present. It is thus seen that it is possible for a small endemic pocket of infection in an area to expand rapidly and to coalesce with other similar areas, widely increasing the endemic range. This, in effect, occurred in New Guinea.

CLINICAL ASPECTS.

The incubation period has been variously estimated at any number of days between five and fourteen. There are usually few, if any, prodromata, the disease most often being ushered in rapidly with symptoms common to many other infections—shivering, headache, lassitude and generalized aches and pains. Occasionally, however, these symptoms may be present in a milder form for several days prior to the onset of fever.

An eschar usually occurs early, associated with generalized lymphadenopathy. About the seventh day a dusky-red macular rash appears. In the second week the fever is higher, the pulse and respiratory rates are increased, and the blood pressure tends to be low. Lassitude and prostration are prominent, and in severe cases restlessness, delirium and coma, passing on to death, may supervene. When recovery occurs, the duration of the fever is usually fourteen to seventeen days, and as a rule the temperature falls by lysis.

It is proposed, for the purposes of description, to divide the disease into four clinical stages. These embody (i) early manifestations, (ii) symptoms and signs of the well-established infection after the first week, (iii) the recovery and early convalescent period, or alternatively the fatal period, (iv) the late convalescent stage.

Stage I: Early Manifestations.

Amongst the early manifestations of the disease which were found to be of value in diagnosis were the following: (i) the eschar, (ii) the lymph gland disorder, (iii) the rash, (iv) the pyrexia, (v) the respiratory symptoms, (vi) the general appearance of the patient.

The Eschar.

When present, the eschar was found to be the most helpful sign in establishing the diagnosis. It is most important that a diligent search be made for this lesion, as otherwise it may easily be overlooked. It is usually single, but may be multiple. The common sites for the eschar are (a) the axilla, (b) the inguinal and genital regions, (c) the lower part of the abdomen, (d) the shoulder. The eschar, however, may be encountered almost anywhere on the body. For example, amongst the cases

observed, an eschar was found in such diverse sites as the ankle, the back of the neck, the forearm, the upper eyelid and the lobe of an ear. The lesion is commonly five to ten millimetres in diameter and is circular in outline. Four stages in its evolution were recognized: (i) an erythematous area, with or without a surmounting vesicle; (ii) an erythematous area, with a black necrotic centre two to four millimetres in diameter; this appearance is almost pathognomonic; (iii) a punched-out ulcer left in the centre of the erythematous area by the detachment of the necrotic centre; (iv) a small, rounded area of skin left by the healing of the ulcer, the reddening of which gradually fades. It has been stressed that the eschar outweighed all other signs in establishing the diagnosis, and frequently it was present when the Weil-Felix agglutination test repeatedly gave negative results. Of the series of 235 cases under review, an eschar was present in 41%. In some cases, small isolated infected skin lesions or "mokka" bites may easily be confused with a true eschar.

The Lymph Gland Disorder.

The lymph gland disorder was found to be of distinct value in establishing an early diagnosis. The lymph glands draining the area of an eschar are always enlarged first, and usually to the greatest degree. Secondly, with the generalized dissemination of the infection, other superficial lymph nodes usually become enlarged and palpable; the most easily felt are the cervical chain, axillae and inguinal groups. The glands are firm, "rubbery", discrete and slightly tender. Due allowance had always to be made for the glandular enlargement secondary to some coincident infected skin lesion. It was because of the prevalence of such skin lesions on the limbs of troops, that the most reliable group for diagnostic purposes was found to be the cervical glands. Glandular enlargement, to a greater or lesser degree, was present in practically every case during the pyrexial stage of the illness.

The Rash.

The rash, when present, commonly manifested itself about seven days after the onset of symptoms. It was of a scattered macular dull pink type, most in evidence over the chest, the arms and the lateral aspects of the abdomen. As opposed to the rash of dengue fever, it lasted for some days, even up to two weeks, and during this time it faded to a faint brown colour. It was not associated with any itching or subsequent desquamation. As part of the general picture, it was occasionally helpful in diagnosis; but the rash had no really distinguishing features, and in many cases it was not found possible to differentiate it from a variety of other rashes met with in this area—namely, the indefinite scattered light erythematous patches which occurred in otherwise healthy troops in this tropical climate. A rash thought to be due to the disease was present in 52% of cases.

The Pyrexia.

When the disease was well established, the temperature chart proved helpful in diagnosis, for almost without exception in severe cases a continuously high pyrexia was present with a slight fluctuation of temperature between 102° and 104° F. At the onset of the disease, the temperature almost always rose sharply within the first twenty-four to forty-eight hours. There it maintained its high level, until, in the case in which recovery would occur, and commonly between the fourteenth and seventeenth days, it fell, usually by lysis, with an accompanying improvement in the general condition of the patient. A point to be stressed is the initial sudden rise of the temperature to its high levels, as opposed, for example, to the "step-ladder" rise of typhoid fever. A glance at the temperature chart of a moderately or severely ill patient usually showed a high pyrexia, monotonously maintained. From time to time, a sudden drop of three or four degrees might occur, after which the temperature would regain and maintain its former high level. In the odd case, a swinging "hectic" type of temperature was encountered. Figure 1 shows the typical temperature readings, and pulse and

respiratory rates, of a patient suffering from scrub typhus of severe type. The readings cover the period from the third day after the onset of symptoms until the twentieth day of the illness. It will be seen that the temperature fell by lysis, the fall beginning on the fourteenth day, with an accompanying fall in the pulse and respiratory rates.

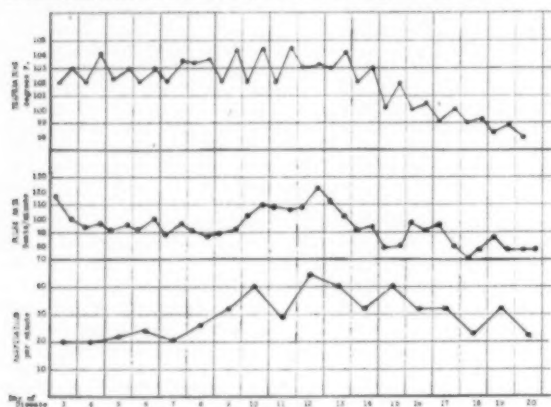


FIGURE 1.

The Respiratory Symptoms.

In the early stages there was often an increase in the respiration rate, associated with a dry, irritating cough, and it was common to find a few adventitious at the bases of the lungs.

The General Appearance of the Patient.

From the onset of the disease, these patients, the mildly ill excluded, had all the appearances of being severely ill with a generalized infection. The face was often flushed, lassitude was pronounced, and conjunctival injection was present. The patients lay back on their pillows complaining of headache, often frontal or retrobulbar, photophobia was present, and they resented any interference or movement. It was this general "toxic" appearance which often in the early stages made one favour a diagnosis of scrub typhus.

Stage II: Symptoms and Signs of the Well-Established Infection after the First Week.

Although the tempo of the disease was increased from the start in many cases, with early manifestations of a severe toxæmia, it was not until the end of the first week that the intensity of the infection usually became obvious. It was found possible to group the cases into two categories—(a) mild infections and (b) severe infections.

The Mild Infections.

In the great majority of the cases under review, the disease was of either moderate or severe intensity. However, the mild infection was a definite entity, the main features of which may be summarized as follows:

The initial symptoms were much less in evidence, and a number of patients, for this reason, remained ambulatory for some days prior to "reporting sick". An eschar was present even in some of these mild cases, and similarly a generalized enlargement of lymph glands. A low-grade pyrexia occurred, the temperature varying between 99° and 101° F.; these elevations were often interspersed with periods of twenty-four to forty-eight hours, during which the temperature would remain normal. The pulse rate was only slightly increased, and physical signs of cardio-vascular failure, commonly present in the severe cases, were not manifest. Respiratory symptoms and pulmonary signs, if present, were few. The patient might complain of some general lassitude, but there was neither the great lethargy nor, alternatively, the restlessness of the very ill patient. In a number of cases the Well-Felix agglutination test against *Bacillus Proteus* OXK¹ produced a positive result to a significant titre—that is, 1/100, or over. The

diagnosis in the remainder rested on the finding of an eschar, or on presumptive evidence when other diseases which had been considered in the differential diagnosis were eliminated, as far as possible, by clinical and special investigations. The pyrexial stage commonly lasted for only eight to ten days, as opposed to its usual duration of fourteen to twenty-one days in the moderate or severe case. It will be understood from the foregoing description that these cases were often labelled "pyrexia of unknown origin" until some significant diagnostic feature was observed. To judge from this experience, there is no doubt that amongst troops a number of men with mild infections remained ambulatory throughout their illness, and for this reason were missed.

The Severe Infections.

The main clinical features of the severe infection are due to the intense toxæmia. Other predominant features are associated with involvement of (i) the cardio-vascular system, (ii) the respiratory system and (iii) the nervous system.

In the series of cases under review, accentuation of symptoms and signs relating to one of these systems gave rise to variations in the clinical picture of the illness, as follows.

Intense Toxæmia.—With regard to intense toxæmia, the main features were, first, extreme lethargy, or alternatively, restlessness and insomnia. Patients with the former lay in bed, unresponsive and drowsy, and sometimes in a low muttering delirium. With the latter they showed motor hyperactivity and *subsaltus tendinum*, a tendency to try to get out of bed unless restrained and a falsely over-alert expression; often perception, orientation and attention were blunted. In the second place, the skin colour was a mixture of pallor and the yellow staining of "Atebrin", which the patients had been taking in suppressive doses, usually for several months previously. The combination of these two colours produced an effect which came to be regarded as not pathognomonic, but fairly typical of the moderate to severe grades of scrub typhus. An exaggeration of the "Atebrin" staining of the skin in these patients as a class has been recognized by other observers, and it commonly lasted well into the convalescent period. The third feature was a rapid, initially bounding pulse and a further increase in the respiratory rate. The fourth feature was the occurrence of drenching sweats, and the fifth the gradual onset of cyanosis, and a poor return of circulation when pressure was applied to peripheral areas, such as nails, skin and ears. Finally, epistaxes and a few petechial hæmorrhages might occur in the later stages of the illness.

The Cardio-Vascular System.—The outstanding physical signs in the cardio-vascular system were as follows. In the initial stages of the disease, no dilatation of the heart could be detected clinically, but during the height of the toxæmia dilatation was the rule, the apex beat moving out to a variable distance beyond the nipple line. Upon auscultation, it was not uncommon to find triple rhythm, in some cases of the presystolic type thought to signify atony of the ventricular muscle, in others of the type often associated with mitral stenosis. Weakening of the first sound at the mitral area almost invariably occurred, and was taken to indicate a so-called "toxic myocarditis". Rather characteristic of the disease in its earlier stages was a pulse rate slow in proportion to the temperature; but it was often found—and invariably in those cases which progressed to a fatal issue—that rapidly the pulse rate would increase from, say, 85 to 90 per minute to 110 or 120 per minute. This change occurred earlier in some cases than in others; but the usual time was about the twelfth to the fourteenth day—that is, when the patient was reaching a critical period. There was a general tendency for the systolic and diastolic blood pressure, especially the former, to fall concurrently with the length of the illness. It was found that a falling blood pressure and a rising pulse rate were significant of an increasing severity of the infection, and consequently of a poorer prognosis. The blood pressure would commonly be maintained at 130 or 120 millimetres of mercury (systolic) and

80 or 70 millimetres (diastolic) for the first ten or twelve days, and then a fall usually occurred, until by the critical fourteenth or seventeenth day the typical readings in a case of severity would be 100 or 90 millimetres of mercury (systolic) and 70 or 65 millimetres (diastolic). Cyanosis, as previously mentioned, was a common sign. The earliest manifestations of oedema occurred over the feet, the lower ends of the tibiae or the sacral area; it was present in approximately 20% of cases. No patient with a generalized anasarca was encountered, nor did other accompaniments of well-established congestive cardiac failure occur—namely, jugular distension and tender, enlarged liver.

Serial electrocardiograms were made in thirty of the moderate or severe infections. The following results were obtained. (i) No abnormal rhythms were noted, and in only one tracing were premature ventricular extrasystoles revealed. In April, 1944, when for a period the electrocardiograph was undergoing repairs, one patient, who died eight days after the onset of his illness, and who presented the picture of "intense toxæmia", suffered from several attacks in which both the ventricular and pulse rates varied between 180 and 200 per minute, the beats being regularly spaced. Unfortunately no tracing could be taken, but the clinical diagnosis was that of paroxysmal tachycardia. (ii) Approximately 20% of patients showed evidence of first degree heart block, with prolongation of the P-R interval up to a maximum of 0.3 second. (iii) Low T waves in the three standard leads were commonly found, and one tracing showed very low QRS complexes. (iv) Serial electrocardiograms, repeated every seven to fourteen days during the course of the illness, including the earlier convalescent period, showed, in those cases in which abnormal findings had been discovered, that there usually occurred, concurrently with an improvement in the general condition, a progressive return of the electrocardiogram towards normal. The above changes are simply those which may occur in any severe generalized infection with toxæmia, and it is perhaps pertinent to note that gross signs of interruption of the conducting fibres within the heart were not encountered.

In a series of 25 cases of the moderate or severe infections, weekly X-ray examinations of the chest by means of a portable machine in the ward were carried out. The following abnormalities were noted: (i) varying degrees of cardiac dilatation, mostly slight, and involving chiefly the right side of the heart; in some cases, the left side of the heart was also dilated; (ii) dilatation of the pulmonary arteries; (iii) congestion of the peripheral pulmonary vessels; (iv) elevation of the diaphragm from gaseous distension of the bowel in a few cases, and in others, a small hydrothorax, unilateral or bilateral; (v) apart from congestion, no definite abnormalities in the lungs. These signs gradually disappeared concurrently with the general improvement in the patient's condition.

The Respiratory System.—The following signs were noted in the respiratory system. Although the respiratory rate showed a tendency to be increased from a fairly early stage of the disease, in severe cases it was not until the critical period, beginning about the twelfth or fourteenth day, that this increase became pronounced and associated with dyspnoea. It usually coincided with the period of rising pulse rate and falling blood pressure, and thus probably was the resultant of the failing circulation as much as, or more than, of the increasing pulmonary consolidation and consequent lack of oxygenation. Cough, unaccompanied by sputum, was found to be a relatively early symptom in the illness. With the progression of the disease, it usually became more troublesome, although by no means so severe as that met with in tracheo-bronchitis or pneumonia. The sputum throughout was scanty, and of the thin, mucoid, clear type. Only rarely did it become frankly purulent, and this was taken to indicate the probable occurrence of some secondary infection of the lungs. Surprisingly enough, in view of the post-mortem finding of intense hæmorrhagic parenchymal infiltration in the lungs, blood-stained sputum rarely occurred. At autopsy, the alveoli in the affected parts of the lungs were usually found to be filled with a clear albuminous fluid, free of fibrin; this latter characteristic probably accounted

for the type of sputum, which had none of the sticky qualities so characteristic of, say, lobar pneumonia.

On percussion and auscultation, the following physical signs were usually to be found, especially at the lung bases (commonly that of the right lung) and low in the axillae. There was impairment of percussion note, not amounting to the flat dulness of fluid, although it was usual to find a small amount of fluid in both pleural cavities at post-mortem examination. Râles and crepitations were plentiful over the affected areas, and occasionally, in the earlier stages, before the physical signs had become predominantly localized to the lung bases, scattered rhonchi were to be heard throughout both lungs. In one case asthmatic attacks occurred concurrently. In some cases the breath sounds took on a harsh quality over the areas of impaired percussion note; but it was rare to find definite bronchial or tubular breathing. In the series under review, a friction rub was heard in only four patients.

The Nervous System.—The early lethargy of the patient has already been noted. As the illness progressed, and especially towards the end of the second week, the following signs were often present. (a) Insomnia. (b) Increasing restlessness, or increasing lethargy passing on to a comatose condition. (c) Delirium. (d) A general increase in rigidity, with or without tremor, and resembling the clinical picture of a lesion affecting the basal ganglia; this formed an outstanding picture in one case, and was associated with an apparent partial bilateral ptosis. (e) Diminution or absence of tendon reflexes. (f) Headache, mainly frontal, retrobulbar or vertical, which was a prominent and distressing feature of most cases from the start of the illness, and it more often than not lasted throughout the whole pyrexial stage. In a few cases there was some neck rigidity, with doubtful presence of Kernig's sign. The question whether meningitis or meningo-encephalitis was present was raised from the clinical picture in approximately twelve cases, in some of which lumbar puncture was performed, both for diagnostic purposes, and to ascertain whether this procedure, with the evacuation of some cerebro-spinal fluid, would lessen the headache. The cerebro-spinal fluid was not under increased pressure, and it was not found that the withdrawal of ten to twenty cubic centimetres gave rise to any appreciable relief of the headache. The laboratory findings on the fluid are referred to in Major McGovern's paper. (g) Absence of isolated cranial nerve palsies, except nerve deafness, usually bilateral. This feature was noted in 15% of cases. It had almost invariably resolved by the time the patient left hospital. In those cases in which associated quinine therapy was being given, difficulty was experienced in the interpretation of the causation of the deafness. (h) Terminal incontinence of urine and faeces.

Comment.—The above description has detailed the outstanding clinical features of the severe infections seen during the acute pyrexial stage, between approximately the seventh and fourteenth to seventeenth days. In addition, other symptoms and signs were noted during the course of the disease and especially after the first week. They may be divided into (a) those referable to the abdomen and (b) those related to the urinary system.

Although constipation was an early feature of the disease, it was found that in approximately 60% of cases, during the more toxic phases, constipation was replaced by diarrhoea, sometimes amounting to six to eight bowel actions per day. The diarrhoeal stool was of the watery type, unmixed with blood or mucus. Faecal specimens from such patients were subjected as a routine measure to bacteriological investigation. In the great majority no exudate or pathogens were found, but in a few cases the coincident diagnosis of bacillary dysentery, and in one case that of amebic dysentery, was established. The former was almost invariably due to *Bacterium dysenteriae* Flexner. The diarrhoea quickly subsided with the overcoming of the infection.

A prominent clinical sign in the critically ill patients was abdominal distension. At autopsy, the large bowel in such cases was found to be uniformly dilated with gas. Perhaps as a complication to this—or it may be as a

cerebral manifestation of toxæmia—hiccup was sometimes a distressing feature, and was found to be of bad prognostic significance.

With the knowledge of the post-mortem findings of this rickettsial disease, it might have been expected that the spleen be palpable in a high percentage of cases. At autopsy, the spleen was always found to be dark red, moderately enlarged and soft, and it was perhaps on account of this last feature that in only 25% of cases was the spleen found to be palpable. Due allowance had always to be made for a possible coincidental malarial infection, reference to which will be made later.

In a few cases the liver was slightly enlarged.

The tongue was no guide to the course the disease was running. Many patients had a heavily coated tongue until the state of resolution, others a relatively clean and sometimes excessively red tongue even when in *extremis*.

Anorexia was usual throughout the pyrexial course of the illness.

Usually after the first week, albuminuria was almost the rule in the severe cases. In one case, the onset of typical acute diffuse glomerulo-nephritis, terminating in uræmia (the blood urea level being 340 milligrammes per 100 cubic centimetres), ushered in a fatal ending. Blood urea estimations were not made as a routine measure, nor were renal function tests carried out; but another patient, who may be placed in the "intense toxæmia" class, was found to have a blood urea level of 330 milligrammes per 100 cubic centimetres forty-eight hours before death. One other patient passed profuse red blood cells in the urine, and a few others passed pus cells in small numbers. The importance of an adequate fluid intake of six or seven pints *per diem* in the treatment of the disease was early appreciated, and a routine fluid balance chart of every patient was kept. If the patient was progressing satisfactorily, it was found that the urinary output was in the region of 50 to 70 ounces in twenty-four hours. An early sign that the illness was running an unfavourable course was a diminution in the amount of urine, the output falling to thirty, fifteen or as little as five ounces in twenty-four hours. It was not as a rule until the twelfth or fourteenth day that this evidence of impaired renal function began to manifest itself.

Hæmoglobin estimations, red blood cell counts, and white blood cell counts were performed in the majority of cases, other than those in which the patient reached hospital in a convalescent stage. The findings are discussed in Major McGovern's paper.

Stage III: Stage of Resolution or Decline.

The third stage lasted from about the fourteenth or seventeenth day until either convalescence had been established or death occurred.

In the case with a successful resolution, the following clinical features were observed.

1. The temperature, from being maintained steadily at between 102° and 104° F. for the preceding fortnight, fell, usually by lysis, reaching normal in three or four days. There it remained, except for the occasional case in which a low pyrexia would continue for a further period of five to seven days.

2. The general condition of the patient improved. He regained his appetite, his restlessness or lethargy subsided, he slept better, his diarrhoea stopped, and his urinary excretion increased.

3. The abnormal physical signs in the heart largely disappeared, except that the first sound at the mitral area might not regain its normal intensity for several weeks. Evidence of dilatation of the heart was no longer to be found, and the blood pressure began to rise. Oedema of the extremities was absorbed, and cyanosis disappeared.

4. The resolution of the lung signs was more delayed, some impairment of percussion note and a diminishing number of adventitious at the bases commonly persisting for a further one or two weeks.

Such is the picture of the patient who satisfactorily overcame his infection. On the reverse side were the cases

with a fatal termination, and in these the following features were noted.

1. The temperature continued at its high level, sometimes falling considerably, only to regain its former figure. These falls in temperature were often associated with a collapsed state of the patient, with sweating, increase in cyanosis, and a rapid, thready pulse. Terminally, and usually in cases in which cerebral symptoms were present, the temperature reached 105° or 106° F., suggesting loss of control by the heat-regulating centre.

2. A progressive fall in blood pressure occurred, and the pulse would increase further in rate and become almost imperceptible at the wrist.

3. Cyanosis increased, coma supervened, and finally death occurred.

Stage IV: The Stage of Convalescence.

The patient was kept completely at rest in bed for an average of six weeks, during the last two of which he was regarded as being in the initial convalescent period. It was characterized by a steady all-round improvement, except for a few patients who had mild tachycardia, or some residual cerebral symptoms, such as persistent headache, slowness of thought or lack of attention. The rather typical colour of the skin, with its exaggerated "Atebrin" staining, persisted, and in some cases lassitude remained a prominent feature. However, the patients regained a good appetite, put on weight and slept well.

The majority were judged to be fit to sit out of bed during the seventh week after the onset of their illness, and from then on, by carefully graduated exercises, they were encouraged to go about in the ward and then take short walks in the hospital grounds. The most reliable guide to their progress at this stage was found to be the pulse rate, and when this was excessive after mild exercise, they were put back to bed for a further ten to fourteen days. Usually they were fit enough to be sent to a convalescent depot after having been out of bed for about three weeks. At this stage, no further follow-up was attempted of most patients who passed through the hospital.

Those who had made a favourable recovery in their early convalescent period were transferred to a convalescent depot, whereas others, who had either had a very severe illness, or were not showing signs of making a satisfactory recovery, were transferred to Australia for prolonged convalescence under more favourable conditions.

From information supplied from the convalescent depot, it appears that the great majority of patients continued to improve there; they gained in weight and increased their exercise tolerance, and, after having been at the depot for between two and three months, they were regarded as fit to resume duty. Opportunity was afforded in a few cases to review the patients' medical condition a month or so after their discharge from hospital. These were patients who were readmitted to hospital because of such symptoms as lassitude, dyspnoea on exertion, undue tachycardia or dizzy turns, or because of some functional nervous disorder which had apparently directly followed their attack of scrub typhus. One patient, after having been returned to duty, had two "blackouts" when driving a motor-truck, and in one of these the vehicle was turned over; but fortunately the driver was not injured.

If we exclude those who had shown cerebral manifestations of a severe degree during the course of their illness, it appears that the convalescence of most patients is uncomplicated, and as far as can be judged at the present time, recovery may be complete. Diminished exercise tolerance and tachycardia on slight exertion, with a tendency to giddiness, were otherwise the usual sequelae.

CONCURRENT DISEASES AND COMPLICATIONS.

It is realized that the description of the disease as given may not represent the pure effects of this rickettsial infection occurring in an otherwise perfectly healthy subject, for in many cases there were concurrent diseases and other possible factors producing side effects. Of the patients with scrub typhus who passed through the hospital, 51%

gave at one stage or another positive blood findings for malaria. All had been on suppressive "Atebrin" therapy prior to the onset of their disease, and no doubt a proportion of the remaining 49% were harbouring the malarial parasite without showing any clinical or laboratory evidence.

Again, the disease was in some cases associated with bacillary dysentery, with ankylostomiasis, with epidemic hepatitis or with a skin disease. Many of the troops had been exposed to prolonged physical and mental stress, and some had been existing, owing to unavoidable circumstances, on a diet of limited variety with regard to certain essential foodstuffs. No frank under-nutrition of dietary origin was seen; but this factor must be taken into consideration when the influence of the infection is being assessed. Finally, many patients on their admission to hospital were found to be suffering from a moderate degree of anemia, which in a great proportion of instances was attributed largely to malarial infection.

Reference has already been made to some of the complications or sequelae of the disease in the discussion on the convalescent period of the patient. In addition, the following complications were observed during the more acute stages of the disease: (i) one case of pneumonia of lobular distribution, complicated by pulmonary suppuration; (ii) two cases in which the clinical picture was one of meningo-encephalitis; (iii) isolated nerve palsies; these included (a) bilateral nerve deafness in 15% of cases, (b) winged scapula from *serratus magnus* paralysis in one case, and (c) one case of paresis and wasting of muscles of the right shoulder girdle, the deltoid being most affected in the convalescent period. In the last-mentioned case there had been a complaint of rheumatic pains in the affected region during the febrile stage of the illness.

LABORATORY AND DIFFERENTIAL DIAGNOSIS.

The specific laboratory diagnostic aid used was the tube agglutination of *Bacillus Proteus* OXK in the Weil-Felix reaction. This test, although helpful, by no means always gave positive results in undoubted cases of the disease. At least three patients were seen with a well-defined eschar, whose illness ran a typical course, and yet during the whole period of their observation in hospital Weil-Felix tests produced negative results. If the result of the agglutination test became positive, it usually did so about the end of the second week or the beginning of the third week, and most often the titre rose from then on. Other laboratory investigations included (a) examination of the red and white blood cells, (b) serum protein estimations, (c) serum calcium estimations, and (d) cerebro-spinal fluid examinations. The results of these special investigations are detailed by Major McGovern in his paper.

With regard to the differential diagnosis of scrub typhus as met with in the particular area in which this hospital was stationed, it was found that in each case the following diseases had to be considered: (a) malaria, (b) dengue fever, (c) tonsillitis, bronchitis or pneumonia, (d) typhoid fever and *Salmonella* infections, (e) the dysenteries, including amoebic hepatitis, (f) endemic typhus, (g) epidemic hepatitis in the anicteric febrile stage, (h) cerebro-spinal meningitis and meningo-encephalitis, (i) septicaemia, (j) tuberculosis. The main reason for such a wide initial differential diagnosis was that often for as long as a week or more the only diagnosis that could be made was the non-committal "pyrexia of unknown origin". A positive Weil-Felix reaction to a significant titre—that is, 1/100 or over—was taken to establish the diagnosis.

The finding of malarial parasites in blood films had to be interpreted with a certain amount of caution, owing to the fact that the patient may have been suffering from both scrub typhus and malaria. The therapeutic response to antimalarial therapy was in these circumstances essential, especially in severe malignant tertian malaria.

The remainder of the conditions mentioned in the differential diagnosis were each considered on their own merits, and necessary investigations were carried out in the endeavour to prove or disprove them.

In summary, the diagnosis may be obvious from the initial stages or may be arrived at only after two to three weeks of the illness. In some cases, the diagnosis was forced to remain presumptive, on clinical grounds alone, right up to the time of the patient's discharge from hospital.

PROGNOSIS.

For the patient who was only mildly ill throughout the course of his infection, the prognosis was uniformly good, but it was difficult to predict the ultimate outcome for the great majority whose high temperature was continuously maintained for fourteen to twenty-one days, or even longer. One patient was pyrexial for thirty-four days and finally succumbed.

The intensity of the disease apparently varied at different stages of the period of eight months under review, and with the localities in which troops contracted their infection. For instance, when allowance is made for the number of patients admitted to this hospital after the acute stages of their illness had passed, the whole staff of the medical division is in agreement that from October to December, 1943, inclusive, the patients who were desperately ill *ab initio* were few in number. The relative incidence of patients falling into this category rose appreciably during January and early February, 1944, and again during April, 1944. The mortality rates over the periods from October to December, 1943, from January to March, 1944, and from April to May, 1944, are discussed later.

Another point also was noticed—namely, that patients admitted to hospital from a certain locality in the Ramu Valley were in the main all very ill, and among these the death rate was high.

As pointers in prognosis, the following considerations, by experience, were found helpful:

1. The age of the patient. An early impression was formed that those over the age of thirty-five years withstood their infection poorly. However, this was by no means found to be more than a wide generalization, for several robust troops under the age of twenty-five years were overwhelmed by their infection (the youngest being aged twenty-one years), whereas others, aged forty years and over, apparently with a severe type of infection, survived.

2. The length of time which elapsed from the onset of symptoms until the patient came under adequate medical supervision, when complete rest in bed could be instituted. Those for whom this period amounted to several days, and especially those who, during these days, were subjected to unavoidably difficult carrying conditions (though the effort was highly praiseworthy in the circumstances) or exposure, or both, almost invariably were more severely ill than their more fortunate comrades, who were brought to rest under good medical conditions within twenty-four to forty-eight hours of their initial symptoms.

3. The presence of some concurrent disease—for example, severe malignant tertian malaria or dysentery. This was another factor weighing against the patient; but just how much influence this other disease had on the ultimate outcome was difficult to assess. Similarly, those (the great minority) who contracted the disease when in a generally debilitated state, from whatever cause, and often with an associated moderate degree of anemia, stood their infection less favourably.

4. The severity of the infection. Those who appeared desperately ill from the start, with all the characteristics of an overwhelming infection, offered an almost universally bad prognosis. It is difficult to give a clinical description of the disease of such patients, except to remark that they had the appearance of suffering from an "intense toxæmia". In fact, with the exclusion of hyperinfection with malignant tertian malaria, fulminating cerebro-spinal meningitis and other such like septicaemias, to the writers there has appeared no comparable infection which may so overwhelm a robust young adult in such a short space of time. One patient died eight days after the onset of his symptoms, appearing moribund within ninety-six hours.

The ultimate prognosis in the cases under review must at present remain *sub judice*, and reference is made to it in the discussion which follows at the end of this paper.

TREATMENT.

The one outstanding feature of the treatment of this disease is that to date no drug appears to have been found which has any direct or indirect effect on the Rickettsiae, and the patient's own immunological responses appear to be the only specific combatant measures against the organism. All other therapy may be termed supportive.

Several sulphonamides—sulphathiazole, sulphapyridine, sulphamerazine and sulphadiazine—were all tried, with no apparent influence on the course of the disease, and, after early experience, these were reserved solely for those cases in which, from the nature of the sputum, white blood cell count, or physical signs in the lungs, the possibility of a secondary infection arose. Even so, the results were disappointing. It is understood that penicillin has also been tried in this disease without benefit. By experience, the treatment evolved and put into effect in this hospital was as follows.

1. Absolute rest in bed with the most careful nursing. Above all, this was the sheet-anchor of treatment. It has been said that if a patient with scrub typhus gets out of bed three times, he will die. As a generalization this is true, and it serves to stress the need for attention to all nursing details and for strict supervision, particularly during the second and third stages of the illness, as described.

2. Adequate fluid intake. This was found to be most important, and fluid charts were kept of every patient. An oral fluid intake of six or seven pints each twenty-four hours was aimed at, and it was not found necessary to supplement this with fluids given intravenously. Glucose in the drinks was also "pushed", and beyond this, any light nutritious articles of diet which the patient would take were included.

3. Sedation. In many of the cases, especially of the type described as of "intense toxæmia", sedation was found very necessary. Sodium phenobarbital, potassium bromide and chloral, and small doses of morphine sulphate were found to be the stand-bys. Only by adequate sedation could such patients be made to conserve what energy and staying powers they possessed, to allow time for their immunological responses to overcome their infection.

4. Oxygen therapy. Continuous oxygen was found to be of real value, especially to those patients coming into the groups with predominantly cardio-vascular or pulmonary signs. Not only did this bring about a lessening of the cyanosis and a decrease in the respiratory rate, together with an improvement in the pulse, but the patient himself felt considerably easier when receiving oxygen continuously.

5. Use of stimulants (so-called). These included small doses of brandy in occasional cases, and the use of "Coramine" in large doses in selected cases. The latter was thought to be of some help in bringing about a better respiratory excursion, and in a number of instances, the pulse was improved in volume and tension and cyanosis was lessened.

6. Administration of vitamin B₁. Rather on empirical grounds, it was decided to administer vitamin B₁. It was thought that there was some evidence to suggest that in a proportion of troops coming from isolated areas, a mild degree of vitamin B₁ deficiency existed, and also that possibly vitamin B₁ might, in view of the increased metabolism within the body, fortify the heart muscle for its long fighting journey ahead. At first small doses (ten milligrammes) were given each day, orally or subcutaneously. This method was replaced by one dose of fifty milligrammes by injection, given in the initial stages of the illness. It is impossible to assess whether this therapy had any good effect.

7. Stored blood or concentrated serum transfusion. At first blood, and then concentrated serum, was given by transfusion in an attempt to counteract the fall in blood pressure and the reduction in serum protein content. It

was thought that the tissue-space oedema that occurred might be accounted for, in part at least, by the lowered osmotic pressure of the circulating blood from its diminished protein content. In a small series of cases in which blood or serum transfusion was tried, the serum protein level was not appreciably raised thereby. It was soon learnt that, despite a very slow drip infusion, the circulatory system found great difficulty in dealing with any large amount of fluid introduced intravenously. It was mainly on account of this that the infusion of large amounts—in these cases one litre or over—into the venous system was abandoned. However, a further use for stored blood was arrived at in the case of those patients who, by hæmoglobin estimations, were found to be anemic at the time of their admission to hospital. It was thought that the only time for intravenous infusions lay within the first few days of admission to hospital, when the patient's cardio-vascular system might reasonably be expected to be able to deal with the added fluid. Furthermore, it was thought that the patient should not be permitted to progress into the acute stage of his illness with blood of lowered oxygen-carrying capacity, if this could be avoided. Consequently an arbitrary hæmoglobin level of 11 grammes per 100 millilitres of blood was selected, and patients whose hæmoglobin value was below this figure were given small drip transfusions of stored blood (300 to 500 cubic centimetres), which in some cases were repeated two or three times at intervals of a few days. No adverse effects on the circulation occurred, and although the series was small, this treatment was thought to be a worthwhile measure, always provided that the patients for such therapy were carefully selected.

8. The exhibition of "Atebrin". After their progress had been watched over the first three months, all patients suffering from scrub typhus were given 0.1 gramme of "Atebrin" three times a day. The reasons for this were two. (a) It was thought that this dosage would lessen the chance that any suppressed malarial infection might break through during the more acute stages of the disease. (b) Apparently encouraging results have been reported in the treatment of two other rickettsial diseases—namely, Rocky Mountain fever and epidemic typhus—with "Quinacrine" in association with calcium. From the available data, it was not possible to assess the value, if any, of this addition to the treatment. However, it seems most improbable that the drug exerted any specific action against the *Rickettsia orientalis*.

9. Calcium therapy. It was decided to try this addition to the standard treatment adopted at this hospital for three reasons. (i) A lowered serum calcium level was found to be an almost invariable feature of the disease if at all severe. (ii) Calcium has been reported as being of value in the treatment of typhus. (iii) Increased permeability of capillaries and small blood vessels was suggested clinically by the appearance of tissue oedema, and further evidence was lent to this suggestion by the morbid anatomical findings. It has been thought by some physiologists, although the evidence is meagre, that calcium may play some part in governing the permeability of small blood vessels, especially the capillaries. There is no doubt that damage to the endothelial lining of blood vessels occurs as an outstanding feature in this rickettsial disease. Major McGovern points out that the available evidence leads towards the conception that scrub typhus is of such a nature that the main brunt of the attack is borne by the reticulo-endothelial system. As is well known, a considerable part of this system occurs in the cells forming the endothelial lining of blood vessels. These clinicopathological points are brought to notice at this stage as an additional reason why it was thought that the administration of calcium might possibly have some logical place in the treatment of this disease. Calcium therapy was instituted not without due consideration as to its possible adverse effects on the heart muscle, the extreme example of which is "cardiac rigor". It was used in only a few cases at first; but during the last five months of this review it was given, almost as a routine measure, in cases judged to be of a severe type. This series is small, owing to the decline in the number of admissions to hospital,

twenty patients only being given this treatment. In judging the effects of treatment with calcium, a corresponding number of cases of the same clinical severity, in which this therapy had not been given, were used for rough comparison. Calcium was administered by one of two routes, the intravenous or the intramuscular route, usually the former. The preparation employed was a 10% solution of calcium gluconate, and the dosage given was 10 cubic centimetres, and in occasional cases 20 cubic centimetres, per day, during the acute pyrexial stage of the illness. The average total dosage per case was approximately 90 cubic centimetres, each of the twenty patients receiving at least 60 cubic centimetres. The maximum total dosage given was 140 cubic centimetres.

No immediate untoward reactions were noted. In one case, the repeated intramuscular injection of calcium deep into a buttock was thought to have been the probable cause of a large subcutaneous and intramuscular abscess. No local venous thromboses occurred. The impressions formed upon the effects of this therapy were as follows. (i) The blood pressure was raised, and with repeated injections of calcium this rise was often maintained. The average increase in pulse pressure was ten to twenty millimetres of mercury. (ii) The heart action became more vigorous, and the pulse increased in volume and tension. (iii) Those patients who were given calcium early in their disease showed less oedema than those who did not have this therapy. (iv) Calcium therapy had no effect on the duration of illness, the pyrexia, or the cerebral manifestations of the disease, although it tended to decrease the restlessness of the patient, and when a collapsed state occurred, the administration of calcium appeared to bring about an improvement. (v) The progressive fall in serum calcium level was often arrested, but never was the level raised to normal figures by this therapy. (vi) In summary, calcium therapy in the twenty cases in which it was used, as far as could be judged, appeared to be of some benefit to each of the patients. However, the number is too small to allow any definite conclusions to be drawn, and evaluation of the method must be left until after its employment in a carefully controlled series of patients suffering from the severe grades of the disease.

10. Treatment during convalescence. This consisted simply of adequate rest and graduated exercise, a nutritious diet, correction of any anaemia with iron, and various forms of entertainment or occupational therapy as supplied by the Red Cross Society or the education or amenities services.

DEATHS.

If all patients are included who passed through this hospital between October 1, 1943, and May 31, 1944, whether having been admitted to the hospital in a convalescent stage or during the acute phases of their illness, the number of deaths that occurred, and the mortality rates, are contained in Table I.

TABLE I.

Period.	Number of Cases.	Number of Deaths.	Mortality Rate.
October to December, 1943 (inclusive)	125	4	3.2%
January to March, 1944 (inclusive)...	95	14	14.7%
April and May, 1944 (inclusive) ..	15	2	13.3%
October, 1943, to May, 1944 (inclusive)	235	20	8.5%

The actual causes of death are discussed in Major McGovern's paper. In general descriptive terms, from the clinical aspect, death was almost invariably due to the following causes, one or more of which were always present in combination: (a) toxæmia from the rickettsial infections; (b) cardio-vascular failure; (c) lesions in the cerebrum; (d) hæmorrhagic oedema in the lungs; (e) lobular pneumonia. Additional causes of death in isolated cases were (i) acute diffuse glomerulo-nephritis, (ii) pneumonia followed by pulmonary suppuration from secondary infection.

DISCUSSION.

The lack of detailed statistics in this paper is admitted; but it was primarily conceived for the purpose of presenting a clinical description of the disease as encountered in New Guinea.

There seems no doubt that the infection is generalized throughout the body, and the pathological findings appear to indicate that its main force is on the reticulo-endothelial system, diffuse vascular damage invariably occurring. This damage may give rise to increased capillary permeability, and, as a secondary result therefrom, oedema of the tissue spaces. If such is the case, this would explain in part the decrease in levels of serum protein and serum calcium, approximately 4.5 milligrammes per 100 cubic centimetres of the latter, out of a total of nine to eleven milligrammes per 100 cubic centimetres, being bound to the serum protein. Furthermore, the drop in osmotic pressure within the capillaries, secondary to the lowering of serum protein, of itself would tend to increase tissue oedema. Another factor which has to be taken into consideration in the explanation of the oedema, is the anoxæmia consequent upon the associated cardiac failure and pulmonary consolidation. This anoxæmia has its own deleterious effects on the capillary endothelium, contributing further to the peripheral circulatory failure. It has been mentioned earlier that gross venous congestion with the characteristic features of congestive cardiac failure does not form a feature of this disease, although in many cases there is clinical, radiological and electrocardiographic evidence of cardiac damage, supported by post-mortem findings.

Many factors have to be taken into consideration in the explanation of the tissue oedema and lowered serum protein and serum calcium levels. Some of these have been discussed, but the elucidation of these findings in this disease must await further investigations.

An additional point arising for clinico-pathological discussion is the fact that the pathologist, in post-mortem studies, found no evidence of fibroblastic activity. One implication of this is that visceral fibrosis as a sequel to this disease may be at the most rare, but at this juncture this must remain open to question. However, with the exception of two patients with persistent cerebral symptoms and a small number with continued tachycardia and diminished exercise tolerance, the evidence, during the period for which they were observed, suggests that recovery may be complete in so far as functional activity is concerned. The solution of this last question necessitates a follow-up over a period of years of patients who have suffered from scrub typhus.

SUMMARY.

1. A clinical description of scrub typhus is given from the experience gained by the study of 235 cases of this disease at varying stages of the illness and encountered at an Australian general hospital stationed in New Guinea.
2. The treatment adopted at this hospital is detailed, together with a brief discussion on the diagnosis and prognosis.
3. The mortality rate in this series of cases is discussed, and a reference is made to the immediate complications and sequelæ and the possible end-results of this rickettsial infection.
4. Various clinico-pathological points and their possible correlation are discussed, and it is suggested that the disease is one primarily affecting the reticulo-endothelial system.

ACKNOWLEDGEMENT.

Acknowledgement is made to Major V. McGovern, pathologist attached to this hospital, for his painstaking and praiseworthy laboratory work, and for his permission to make use of his findings in the compilation of this paper. Finally, as the same series of cases was used for the substance of both his and this report, it is recommended that they should be read in conjunction with each other, as an attempt has been made by the authors of both papers that each shall act in relief to the other.

PATHOLOGICAL ASPECTS OF SCRUB TYPHUS IN NEW GUINEA.

By V. McGOVERN.

Major, Australian Army Medical Corps.

A SERIES of 134 cases of scrub typhus occurring in New Guinea was investigated by the pathology department of an Australian general hospital. These patients were generally admitted to hospital with the label "pyrexia of unknown origin", and the routine investigations instituted were as follows: (i) examination of blood films for malarial parasites; (ii) blood counts; (iii) performance of the Weil-Felix test; (iv) urine examinations; (v) faeces examinations; (vi) investigation of the blood chemistry; (vii) miscellaneous examinations. In 51% of all cases of scrub typhus, malarial parasites were found in the peripheral blood at some stage of the disease, despite the continuation of suppressive "Atebrin" therapy.

The Blood Picture.

No typical blood picture was found in blood counts performed in 121 cases of scrub typhus in the early stages of the disease. The total number of white cells varied from 3,000 per cubic millimetre to 22,000 per cubic millimetre, 58% of the counts being between 5,000 and 9,000 cells per cubic millimetre. The average figure for all cases was 8,100 white cells per cubic millimetre.

In the majority of cases, both the absolute number of lymphocytes and the absolute number of neutrophile cells were in the region of normality—that is, the lymphocytes varied in number between 1,000 and 3,000 per cubic millimetre and the neutrophile cells between 3,000 and 6,000 per cubic millimetre. However, nearly always a pronounced regenerative shift was observed in the neutrophile series, as well as increase in the number of large lymphocytes, as many as 6% being atypical basophilic forms and up to 3% atypical plasma cells. Lymphocytosis was present in 23 cases (19%), lymphopenia in 24 (19·1%), neutrophilia in 36 (29·7%) and neutropenia in 18 (14·9%); in certain cases two of these abnormalities were present—namely, lymphocytosis or lymphopenia and neutrophilia or neutropenia. In the remainder no abnormal change was detected in the absolute number of the various cells. Of fifteen patients who died, there were six with lymphopenia, one with lymphocytosis and neutrophilia, and five with neutrophilia, and the remaining three had no increase in the absolute number of lymphocytes or of neutrophile cells.

The type of blood picture found in the early stages was no guide to prognosis, although on subsequent analysis the group of patients with lymphopenia was found to have the highest mortality rate—namely, six out of twenty-four.

During the course of the disease, the haemoglobin value often fell to the region of 11 grammes per 100 millilitres of blood. A contributory factor in the anaemia was probably concurrent malarial infection, and even when parasites were not detected in the peripheral blood, a number of patients may have been suffering from suppressed malaria.

The Weil-Felix Tests.

Agglutinins for *Bacillus Proteus* OXK were detected by the use of a suspension of a smooth strain, which was resuspended in normal saline solution after being treated with absolute alcohol for twelve hours. Each batch of suspension was compared with the previous suspension against a serum of known titre. When a preservative was used in the suspension, a drop of chloroform sufficed. The suspension was always kept refrigerated. A good suspension did not form a sediment on standing for a few days. The eventual concentration aimed at in the agglutination tubes was about 300,000,000 organisms per cubic centimetre.

Non-specific agglutination occurred mainly with serum dilutions up to 1:25, occasionally 1:50, rarely 1:100. As in some cases of typical scrub typhus a titre of only between 1:100 and 1:200 was produced, a titre of 1:100 or more was regarded as diagnostic, though tests were repeated in the endeavour to obtain a higher titre reading.

The earliest day of the disease on which the titre became diagnostic was the sixth, with a titre of 1:200, and the latest was the twenty-sixth day, the average being between the twelfth and fifteenth days.

The agglutinin titre rose to varying heights, the highest being 1:13,000. In occasional cases of scrub typhus that were clinically typical, no agglutinin titre was ever found; three patients were never found to have a titre despite repeated tests. In other cases the titre rose only to 1:200 and fell rapidly within a fortnight. In one such case agglutination of *Bacillus Proteus* OXK was obtained with a titre of 1:50, three days later with a titre of 1:100, nine days later with a titre of 1:50, and a fortnight later no agglutinins were detectable. In another case the agglutinin titre fell in eight days from 1:1,600 to 1:25.

No regular follow-up examinations were carried out to detect the persistence of serum agglutinins for *Bacillus Proteus* OXK, though there were fourteen cases in this series in which the titre disappeared within a fortnight.

No prognostic significance could be deduced from the duration of the disease before serum agglutinins for *Bacillus Proteus* OXK appeared.

Urine Examinations.

Gross urinary abnormalities were present only in fatal cases. Proteinuria of mild degree was common, increasing in cases with a fatal outcome, when red cells and pus cells often made an appearance in the urine. One patient developed acute glomerulo-nephritis and died in the uraemic state. *Bacillus Proteus* with the biochemical and serological reactions of the Kingsbury strain was occasionally isolated in culture from the urine.

Stool Examinations.

Apart from those patients who had bacillary dysentery in addition to scrub typhus, there were many who had loose stools; occasionally these contained mucus in which some macrophages and epithelial cells were present. *Bacillus Proteus* OXK was occasionally recovered in culture.

From the stool of one patient, who had a history of a febrile illness three weeks previously which had been regarded as dengue fever, *Bacillus Proteus* OXK was recovered, and was agglutinated by his own serum to a titre of 1:800, as also was the standard suspension.

From the stool of another patient who had no history of any febrile illness, *Bacillus Proteus* OXK was recovered. His serum, however, contained no agglutinins either for his own organism or for suspensions of the standard culture.

Sputum Examinations.

After the sixth day, many patients produced a frothy sputum which was occasionally blood-stained. The cellular content was relatively low, the cells being mainly mononuclear cells with a few polymorphonuclear cells. An increase in polymorphonuclear cells was taken to indicate the possibility of a secondary infection. The organisms found in the sputum were of mixed type.

Blood Chemistry.

It was found that the serum protein values were usually lowered.

In mild cases the values were in the region of normality, but in most cases there was a progressive fall till the lowest level was reached just before or at the time when the agglutinins were commencing to appear in the serum—namely, about the end of the second week of illness. The lowest figure recorded was 4·0 grammes per 100 millilitres.

Determinations of serum protein content in 100 cases at the time when the lowest value was expected gave an average value of 5·3 grammes per 100 millilitres. Except in patients who were very ill, the serum protein value rose concurrently with the serum agglutinin titre.

In a typical moderately severe case, the figure of 4·8 grammes per 100 millilitres was obtained with no Weil-Felix reaction; the figure rose to 5·8 grammes per 100 millilitres three days later with a titre of 1:100, and to 6·2 grammes per 100 millilitres a week later again, when the titre was 1:800.

One patient, whose blood serum had an agglutinin titre of 1:3,000 on the sixteenth day of his illness, the serum protein value being 4.1 grammes per 100 millilitres, died on the thirty-fourth day, when the serum protein level had not risen above 4.8 grammes per 100 millilitres despite repeated infusions of concentrated plasma.

TABLE I.

Serum Protein Values. (Grammes per 100 Millilitres.)	Number of Patients.
4.0 to 4.5	7
4.6 to 5.0	19
5.1 to 5.5	42
5.6 to 6.0	21
6.1 to 6.5	11
Total	100

Serum calcium determinations were made in 58 cases of scrub typhus. The determinations could not be repeated very often throughout the course of the illness owing to the pressure of other work. The serum calcium level was found to fall in the first week in the majority of cases concurrently with, though not proportionately to, the serum protein level, and then to rise again in the same manner, the lowest level being reached at or just before the period when serum agglutinins for *Bacillus Proteus* OXK were appearing. In six mild cases there was no reduction below 9.0 milligrammes per 100 millilitres, while the values in the remaining 52 cases were between 6.0 milligrammes per 100 millilitres and 8.9 milligrammes per 100 millilitres. The average figure in all cases, taken when the value was expected to be lowest, was 8.1 milligrammes per 100 millilitres. The serum calcium level in severe cases was reduced to between 7.0 and 7.5 milligrammes per 100 millilitres, and in these it took longer to regain normality. The two lowest figures were 6.0 milligrammes and 6.2 milligrammes per 100 millilitres. Both patients died.

TABLE II.

Serum Calcium Values. (Milligrammes per 100 Millilitres.)	Number of Patients.	Percentage.
6.0 to 6.5	2	3.4
7.0 to 7.5	12	20.7
7.6 to 8.0	15	25.9
8.1 to 8.5	12	20.7
8.6 to 9.0	13	22.4
9.1 to 9.5	2	3.4
9.6 to 10.0	2	3.4
Total	58	—

No table of figures for the serum protein and serum calcium values of those patients who died can be given, as most of the investigations were carried out after the majority of the deaths had occurred.

For comparison, determinations of serum protein level and serum calcium level were made in 41 cases of other febrile illnesses. There were eleven malarial infections, thirteen cases of epidemic hepatitis, ten cases of dengue

fever and six cases of dysentery (four Shiga infections and two Flexner infections).

No opportunity arose to compare the serum calcium and serum protein levels in other prolonged pyrexial diseases, except in one case. This was a case of generalized dermatitis and polyarthritis in the fifth week of a fever, the temperature fluctuating between 101° and 103° F. The serum calcium value was 10.2 milligrammes per 100 millilitres and the serum protein value was 6.5 grammes per 100 millilitres.

In one case of malaria, the figures of 5.5 grammes per 100 millilitres for serum protein content and 9.0 milligrammes per 100 millilitres for serum calcium content were obtained. In the remainder the figures were normal.

In the epidemic hepatitis cases, the lowest serum protein figure obtained was 5.8 grammes per 100 millilitres and the lowest serum calcium figure was 9.5 milligrammes per 100 millilitres.

One patient with a dengue infection had a serum protein value of 5.8 grammes per 100 millilitres, but a normal serum calcium figure; the remainder had normal figures for both serum protein and serum calcium levels.

In dysentery, though the series was small, a fall in serum protein level was detected; but in only one case was a fall in serum calcium level found, the value being 8.4 milligrammes per 100 millilitres.

Table III gives the average figures for various infectious diseases. It can be seen that of the conditions investigated, scrub typhus produced a much more pronounced reduction in both serum protein and serum calcium values than the other diseases.

Blood Urea Content.

Determinations of blood urea content by the urease-azeration technique were made in two cases only. In each a progressive rise occurred, and just before death the values were 330 milligrammes and 340 milligrammes per 100 millilitres respectively. The histological picture in one case was that of acute glomerulo-nephritis, and in the other, congestion and oedema of both the parenchyma and the interstitial tissue were the main renal findings.

Cerebro-Spinal Fluid.

In four cases of scrub typhus, cerebro-spinal fluid examinations were made, with the following results:

CASE I.—The patient had severe headache with some neck stiffness. The cerebro-spinal fluid was clear; four or five mononuclear leucocytes were present per cubic millimetre; the total protein content was 20 milligrammes per 100 millilitres; the Nonne-Appelt test produced negative results.

CASE II.—The patient had severe headache. The cerebro-spinal fluid was clear; five or six mononuclear leucocytes were present per cubic millimetre; the total protein content was 15 milligrammes per 100 millilitres; the Nonne-Appelt test produced negative results.

CASE III.—The patient suffered from pronounced meningism. The cerebro-spinal fluid was clear; cells numbered 80 per cubic millimetre, 70% being mononuclear cells and 30% polymorphonuclear cells; the total protein content was 80 milligrammes per 100 millilitres. The Nonne-Appelt test produced a positive reaction; the Kline and Kahn tests produced negative results.

CASE IV.—The patient had shown severe cerebral symptoms during the course of the fever, and on his discharge from hospital was still melancholic. It was not known whether the patient had a melancholic disposition prior to his illness, but his cerebral condition certainly became worse

TABLE III.

Disease.	Number of Cases.	Highest Serum Protein Value. ¹	Lowest Serum Protein Value. ¹	Highest Serum Calcium Value. ²	Lowest Serum Calcium Value. ²	Average Serum Protein Value. ¹	Average Serum Calcium Value. ²
Scrub typhus	58	—	—	10.0	6.0	—	8.1
Scrub typhus	100	6.2	4.0	—	—	5.3	—
Malaria	11	6.5	5.5	11.2	9.0	6.1	9.6
Epidemic hepatitis	13	7.2	5.8	10.5	9.5	6.5	10.0
Dengue fever	10	6.8	5.8	11.0	9.2	6.3	9.9
Dysentery	6	6.0	4.5	9.8	8.4	5.5	9.3

¹ Grammes per 100 millilitres.

² Milligrammes per 100 millilitres.

during the course of his illness. The cerebro-spinal fluid was examined during convalescence; it was clear, and contained two mononuclear leucocytes per cubic millimetre; the total protein content was 50 milligrammes per 100 millilitres. The Nonne-Appelt test produced a positive result. The Kline and Kahn tests produced negative results.

Autopsy Findings.

The earliest death occurred on the eighth day of the disease, and the latest on the thirty-fourth. The majority, however, occurred about the end of the second or the beginning of the third week of the disease. Autopsies were performed upon fourteen subjects who died of scrub typhus. The macroscopic and microscopic findings were fairly constant. Generalized oedema of varying degree and hæmorrhages into the various tissues were often seen.

Heart and Pericardium.

The pericardium usually contained up to two ounces of straw-coloured fluid, and invariably the right side of the heart was dilated. In one case, epicardial petechiæ were present. Microscopic examination revealed fairly consistent pathological changes, though the degree was variable. The muscle fibres were frequently somewhat degenerated; sometimes fragmentation was evident, and in one case in which oedema was found in the sino-auricular node area on macroscopic examination, there was actual necrosis of the auricular muscle.

Round cell infiltration was fairly pronounced throughout the heart, and occurred in the epicardial tissue in most cases. Occasionally free red cells were visible between the muscle fibres and amongst the round cells. Polymorphonuclear leucocytes were very scanty.

Blood Vessels.

Mononuclear infiltration of the intima of the larger vessels, such as the coronaries, was frequently found. Though never very dense, it was of sufficient degree to be significant. The media was usually normal, but in the adventitia perivascular collections of round cells affecting the *vasa vasorum* were often present.

Pleural Cavities and Lungs.

At the majority of autopsies, up to a pint of straw-coloured fluid was found in each pleural cavity. Recent adhesions were found where massive pulmonary hæmorrhages or consolidation had occurred. Subpleural ecchymoses and hæmorrhagic infarct-like areas varying in size and number were seldom absent. These areas in three cases were so massive as to occupy almost the whole of a lobe.

Oedema was a constant finding. At only two of the fourteen autopsies was oedema not a noticeable macroscopic feature. Often in areas that appeared normal, no crepitation occurred when the lung substance was compressed; it had lost much of its elasticity and had a leathery touch to the fingers. The cut surface, apart from the consolidated and frankly hæmorrhagic areas, usually dripped with oedematous fluid, often blood-stained.

Consolidation of the lobar pneumonic type occurred mainly in the lower lobes, at times in a part of one lobe; but in two cases both lungs were completely consolidated except for the apices. In nine of the fourteen cases lobar pneumonia was present, and occasional patches of bronchopneumonia in addition. In three of the remainder small areas of consolidation were present that were only observed microscopically.

Examination of sections from the non-consolidated areas which seemed least affected by hypostasis revealed oedema, hæmorrhage and mononuclear cell reaction. In any lung, grades of involvement could be observed from simple pneumonitis to consolidation.

The vessels were always congested, and many local thromboses, some at the stage of organization, were present. No large vessel thromboses, such as one would expect to account for the large infarcted areas, were found.

The bronchioles often contained exudate consisting of mononuclear cells and varying numbers of polymorphonuclear leucocytes. Sometimes bronchitis was seen.

The alveoli, even in areas that appeared to be normal on macroscopic examination, contained variable amounts of fluid, red cells and mononuclear cells. Frequently collections of heart failure cells were present. In areas that contained no exudate, the alveolar epithelium was swollen, and the cells were rounded and projected into the lumen. In some areas, these epithelial cells could be seen partially detached, forming a cast of the alveolus. Polymorphonuclear leucocytes were scanty in these areas, but round cells could be seen scattered diffusely through the swollen septa. Obliteration of the septa occurred in areas where massive hæmorrhages had occurred. In the consolidated areas, both red and grey hepatization, depending upon the duration of the disease, could be observed. In the patient who died on the eighth day of his illness, extensive pneumonitis only was found. Consolidation apparently occurs about the end of the second week.

Liver.

On macroscopic examination, the liver was affected by some cloudy swelling, but little else. Examination of sections, however, revealed more extensive degeneration, mainly cloudy swelling, fatty degeneration, and varying degrees of necrosis confined mainly to the centres of lobules. In some livers the degeneration had proceeded to a degree that partially obliterated the lobular pattern. Round-cell infiltration was confined mainly to the interlobular connective tissue.

Spleen.

Enlargement of the spleen to two or three times normal size was usual. The medulla was always congested and diffuent. Packing of the sinusoids with red cells, and lymphocytic and endothelial cell proliferation, were the usual findings. In one case in which death occurred within ten days, cytoplasmic inclusion bodies resembling Rickettsiæ were observed in the endothelial cells, in smears made from the cut surface of the spleen.

Kidneys.

One patient developed acute glomerulo-nephritis and died in the uræmic state in the fifth week. Examination of the kidneys revealed the typical changes of diffuse glomerulo-nephritis.

In the main, the macroscopic appearance differed little from normal. Microscopically, some involvement of both glomeruli and tubules was invariably found. Congestion of the vessels, small hæmorrhages and small vascular thromboses were seen. The glomerular changes, when present, consisted of swelling of the tufts and of the cells of the tufts. The capsular space sometimes contained albuminoid material, but no cellular exudate. In the tubules, necrosis of the epithelium with partial obliteration of the lumen by cellular debris was fairly widespread. Round-cell infiltration of the adventitia was present always.

Adrenals.

In the adrenals, destruction by hæmorrhage as in the Friedricksen-Waterhouse syndrome was never seen, but changes of a fairly extensive degree were found, consisting mainly of necrosis, more pronounced in the medulla. Round-cell infiltration was also observed.

Other Abdominal Organs.

Pronounced dilatation of the large gut by gas was a constant feature; otherwise no outstanding lesions were found in the other abdominal organs.

Brain.

On macroscopic examination of the brain, little abnormality was to be seen in most cases. In two cases, oedema of the meninges was observed. When sections were prepared, the meninges were found to be tightly infiltrated by round cells, and oedema was occasionally observed. In the brain thrombosis of some vessels were present. Perivascular cuffing was occasionally observed, but it was of minor degree. Round-cell infiltration was always pronounced. Aggregations of inflammatory cells were scanty.

In the neuroglia, especially in the regions of the vascular thromboses, destruction was present, mainly of necrotic type. Axonal degeneration was fairly widespread in one case, and in this brain also an increase in neuroglia was found.

It was shown, therefore, that a meningo-encephalitis is a feature of scrub typhus.

Summary.

1. One hundred and thirty-four patients suffering from scrub typhus contracted in New Guinea were investigated by the pathology department of an Australian general hospital. These patients were all in the early stages of the disease, and patients who were admitted to hospital after the second week of the illness are not included.

2. The chief lesions demonstrated on histological examination were: (i) myocarditis, (ii) pneumonitis and pneumonia, (iii) meningo-encephalitis, (iv) some degree of vasculitis.

3. No attempt has been made to describe a typical pathological process. This presentation is merely the summary of observations in one series of cases, which, with those of other investigators, may contribute to the eventual integration of the characteristic pathological picture of this infection.

Acknowledgements.

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Reports of Cases.

A CASE OF THE GUILLAIN-BARRÉ SYNDROME IN A CHILD.

By D. CLARK RYAN,

Brisbane Children's Hospital, Brisbane.

IN recent years, the Guillain-Barré syndrome appears to have become more recognized as a clearly defined clinical entity, and so far as the Australian literature on the subject is concerned, articles by Susman and Maddox⁽¹⁾ and still more recently by Kennedy⁽²⁾ have done much to bring this disease before the minds of the medical profession. The case about to be reported is of particular interest, inasmuch as it conforms in almost all details with the original description as set out by Guillain and Barré themselves in 1916. In spite of the opinions of these authors, the syndrome has been shown to be relatively prevalent amongst children,⁽³⁾ and in seven cases reviewed by Susman and Maddox three of the patients were children, and in the case reported by Kennedy also the patient was a child. Another point of interest in this case lies in its relative severity, as at one period the question was being considered whether it would be necessary to place the child in a respirator. It is to be noted that those proved cases of the Guillain-Barré syndrome which ended fatally were in all instances due to involvement of the respiratory musculature, with a resultant fatal bronchopneumonia. The high level of globulin in the cerebro-spinal fluid at one period is also worthy of note.

In a review of the subject in THE MEDICAL JOURNAL OF AUSTRALIA⁽⁴⁾ of some years ago, an appeal was made for reports on the occurrence of this disease, with special emphasis on the cerebro-spinal fluid findings—an undertaking that early investigators tended to omit. It is with these facts in mind that the following case is submitted.

Clinical Record.

R.S., a male child, aged nine years, was admitted to the Brisbane Children's Hospital on November 20, 1944. His mother stated that though the child had always been somewhat thin and pale, he had enjoyed good health until a few days previously, when he had complained of vague pain in the calves of both legs and had experienced difficulty in walking, with progressive fatigue. Paræsthesia in the form of "pins and needles" in his legs had also been a complaint. A striking feature of the malady to date had been the occurrence of really severe headache, often accompanied by attacks of nausea, though on no occasion had he actually vomited. There had been no shooting pain and no pain in the joints. The difficulty in walking had become progressively worse, so that he had to be carried into hospital. Apart from a doubtful attack of diphtheria many years before, he had experienced no definite illness. Until 1940 he had been resident at Darwin, where, the mother stated, there had been some isolated cases of hookworm infestation. One month previously he had fallen and struck the back of his head, without consequences. No evidence of lead poisoning was forthcoming. All other members of the family were in excellent health.

Physical examination revealed a slight, pale lad, lying quietly on a couch with an air of indifference to his surroundings. Relevant findings were confined to the central nervous system. The pupils were equal and central, and reacted to light and accommodation. There was no evidence of bulbar involvement, nor were there any signs of an affection of either the upper extremities or the muscles of the trunk. In the lower extremities both knee jerks and ankle jerks were completely absent, and pressure on the thigh and calf muscles caused much pain. No plantar response could be elicited. No sensory disturbances could be detected. When asked to walk, the child did so with a half-stooping, wobbling gait. The patient was completely afebrile.

On November 21 the child's condition was more or less the same, a type of peripheral neuritis having been suspected. A full blood count was ordered, with a special request for a report on the presence of any basophilia. The examination revealed that the erythrocytes numbered 5,400,000 per cubic millimetre, the hæmoglobin value was 100%, and the colour index was 0.9; the leucocytes numbered 10,000 per cubic millimetre, 70% being neutrophilic cells, 27% lymphocytes, and 3% eosinophilic cells; the platelets were in normal numbers. There was no evidence of punctate basophilia. The Wassermann test failed to produce a reaction. In view of the history of trauma to the skull a skiagram was ordered, but this revealed no pathological lesion. Ophthalmoscopic examination revealed two perfectly normal fundi.

On November 22 the child's condition was obviously worse; he complained of pain in the back, and evidence was present of a commencing paralysis of both deltoids and other abductors of the arm and extensors of the fingers. Flexion of the head on the chest caused pain in the lumbar region of the spine and in both calves. It was on this day that the word "euphoria" was entered for the first time on the chart and that evidence of bilateral weakness of the facial muscles was also noticed. Slight impairment of sensation to light touch was noted over the dorsal aspects of both feet. The calves and thighs were still very tender to palpation. Lumbar puncture was performed, and five cubic centimetres of clear fluid, under a pressure of ninety millimetres, were withdrawn. Queckenstedt's test failed to disclose a blockage. A provisional diagnosis of (a) acute infective polyneuritis, or alternatively (b) tick paralysis, was suggested, though a thorough search for ticks, including both external auditory meati, failed to detect any. During the ensuing night, the child complained of weakness of the arms, with "itching" in his arms and legs. Pain was also present in his left arm and shoulder.

On November 23 all reflexes other than the pupillary and abdominal reflexes were absent, and evidence of a general paresis of all the muscles of the upper limbs, with emphasis on the abductors of the arms and extensors of the fingers, was present. The grip was weak. It was at this stage that the results of the lumbar puncture investigation were received, the high level of protein in the cerebro-spinal fluid (320 milligrammes per 100 cubic centimetres) associated with an acellular reaction at once making the true nature of the condition apparent, and enabling the patient's anxious parents to be immediately reassured. The complete results of this and consequent lumbar puncture investigations are set out in Table I. "Vibex", one cubic centimetre intramuscularly every second day, was ordered, and light splints to correct foot-drop were applied. No significant change occurred for some days.

On November 28 the child was still complaining of severe frontal headache accompanied by nausea. Sweating was noticed to be profuse, even when the hot, humid conditions prevailing were taken into consideration. In this regard, Casamajor and Alpert⁽¹⁾ consider sweating to be an outstanding feature of the syndrome in question. For the first time the child complained of dyspnoea on exertion or on prolonged talking, though when lying quietly he experienced no respiratory distress. Examination revealed that his respiration was almost completely abdominal, there being no evidence of phrenic nerve involvement. A few crepitations were audible at the bases of both lungs, but the patient remained afebrile. That night the condition apparently reached its climax, for his respirations became shallow, and "Carbogen" had to be administered, though it was not considered quite necessary to place the child in a respirator.

The condition lasted for a day or two, with periods of dyspnoea, requiring the administration of "Carbogen", alternating with periods of apparent comfort, but with no further evidence of spread of the paralysis.

From November 30 the condition appeared gradually to subside. Whilst respiration was still abdominal, there was no further dyspnoea, and the child could touch his forehead with both his hands, a performance which hitherto could not be accomplished. Severe headache, often unrelieved by aspirin and requiring morphine, was still present at this stage.

On December 2 it was noticed that the child's grip was stronger, and further evidence of a resolution of the paralytic condition was present. It was on this day that the child was first seen holding a comic paper whilst in the recumbent position. The beginnings of thoracic respiration together with slight pelvic movements and consequent movements of both lower extremities were also noted. A few days later slight movements of both *quadriceps femoris* muscles could be detected on attempted flexion of the thighs.

On December 11 the patient developed varicella and was accordingly isolated. This exanthem did not appear to affect his condition, except to increase his headache and sweating and to cause a slight rise in temperature. Three days later physical therapy in the nature of gentle movements and massage was instituted. After some days the child had fair movement at the hip joints and could also flex his knees, but the feet and the lower parts of the legs were still paralysed. With great effort and assisted by the bed rails he could pull himself into a sitting position. So far, there was not the slightest indication of a return of any of the tendon reflexes.

By December 27 all movements of the upper extremities were completely restored with full power, and movements at the hip and knee joints were also complete. On January 2 the patient could freely move his ankles and toes, and by supporting himself on the bed could pull himself into a standing position. On January 10 it was decided to allow the child to sit up in a chair. This advance was shortly followed by a slight elevation of temperature together with severe headache and the development of a soft systolic murmur with a slapping second sound at the aortic area. These cardiac signs, however, tended to disappear when the erect attitude was assumed. A blood sedimentation rate estimation at this stage proved to be within normal limits.

On January 17 all cardiac signs had disappeared and the temperature was once again normal. It was on this day that, assisted, the patient took his first few steps. He continued to progress, so that by January 22 he could walk at will and was allowed to be up and about. By February 7 the child could walk with ease, and even run, though still with a tendency to foot-drop. No headache, nausea or paresthesia was present; nor was there the slightest indication of a return of any of the tendon reflexes. He was discharged from hospital and advised to attend weekly for further physical therapy.

The results of the lumbar puncture investigations are shown in Table I.

Summary.

A case of progressive, ascending symmetrical flaccid paralysis with involvement of the respiratory musculature is reported in a boy, aged nine years. Function gradually returned in the reverse order, so that within a period of three months almost complete restoration of function of all affected muscles had occurred. Associated with these physical findings was a hyperproteinosis of the cerebrospinal fluid, together with an acellular reaction. This case is considered to be a typical example of the Guillain-Barré syndrome.

TABLE I.
Findings in the Cerebro-Spinal Fluid.

Date.	Protein. (Milli- grammes per 100 Cubic Centi- metres.)	Cells.	Sugar.	Chlorides. (Milli- grammes per 100 Cubic Centi- metres.)	Wasser- mann Test.	Colloidal Gold Test.
22/11/44	320	0	Present.	700	No reaction.	No reaction.
6/12/44	800	—	—	—	—	—
5/2/45	120	3	Present.	710	No reaction.	No reaction.

Acknowledgement.

I am indebted to Dr. Felix Arden, Medical Superintendent of the Brisbane Children's Hospital, for his kindly criticism and permission to report this case.

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TWO CASES OF ATRESIA OF THE CERVIX FOLLOWING FOTHERGILL'S OPERATION.

By HUGH C. CALLAGHER,
Perth, Western Australia.

Case I.

Mrs. P. was aged sixty-five years in 1941, when Fothergill's operation was performed for marked *prolapse uteri* associated with cervical polypus. The uterine cavity was curetted at this time and contained only atrophic endometrium. Convalescence was uneventful, and everything went well until early in 1944, when she complained of urinary disturbance, which took the form of difficulty in the passing of urine. Examination of a catheter specimen of urine at this stage showed evidence of a mild infection. Pelvic examination revealed that the uterus was retroposed and appeared to be larger than at the time of operation. The cervical stump was healthy and the external os normal in appearance. It was not thought that the uterus could be the cause of the bladder difficulty, and topical treatment for the cystitis was given with apparent improvement. There was no vaginal discharge of any nature.

Early in March, 1945, the patient reported again. The bladder trouble had recurred; there was still no vaginal discharge, and the repair appeared perfectly satisfactory. Examination now revealed a tumour extending midway between the umbilicus and the *symphysis pubis*. It was firm and not tender.

Vaginal examination showed the tumour to be an enlarged uterus. In view of its size and rate of growth, carcinoma or degeneration of some type in a myoma was diagnosed.

Operation was performed on April 4, 1945, the enlarged uterus together with the adnexa being removed. The uterus was found to be full of sero-sanguineous fluid, which had its origin in a large carcinoma of the uterine body. The cervical stump in its upper part was atresed. The fluid in the uterus was inoffensive, and there appeared to be no extrauterine extension of the growth. Convalescence to date has been uneventful.

* Case II

Mrs. G., aged fifty-four years, consulted me even more recently. She had had her uterine prolapse corrected by Fothergill's operation eleven months earlier by a gynaecologist. Since then she had complained of dyspareunia, of

a feeling of pressure in the rectum and of some abdominal pain; one recent attack was severe and associated with mild diarrhoea. She had no vaginal discharge. For twelve months preceding her operation she had had some irregularity of the menstrual periods with diminished loss, and her last menstrual period had occurred about two weeks after the operation.

Examination was difficult because of some scarring at the vault and tenderness; but both by vaginal and by rectal examination her uterus appeared to be appreciably enlarged and a little softer than normal; speculum inspection of the vault revealed entire absence of the cervix. A smaller irregular area was presumed to be the remnant of an external os, but a probe could not be passed. A diagnosis of hæmatometra was made.

At operation it was found impossible to pass a sound or probe through the irregular opening at the vault, and only after the mucous membrane had been incised and a prolonged search had been made with a small probe was the cervical canal located. Immediately the probe was passed, typical chocolate-coloured blood flowed out freely, about a small cupful being present. The cervical canal was then dilated without further difficulty.

Comment.

The fact that two cases of this nature came within my experience in such a short period of time suggested that these reports would be worth while.

It seems probable that atresia of the cervical canal in the menopausal patient following cervical amputation is perhaps more common than is realized. Its occurrence can quite well lead to delayed recognition of carcinoma of the *corpus uteri*, and the absence of usual symptoms must not be accepted as excluding this possibility. It seems that in younger women with healthy vaginal mucosa maintained by active ovarian secretion the occurrence of complete atresia is unlikely, although some degree of constriction of the cervical canal not infrequently occurs. The passage of a small dilator through the cervical canal at the post-operative examination may be a suggestion worthy of consideration.

REPORT ON A CASE OF BENIGN TERTIAN MALARIA COMPLICATED BY HERPES ZOSTER AND VARICELLA.

By R. F. A. STRANG,
Major, Australian Army Medical Corps.

Clinical Record.

PRIVATE F., aged thirty-four years, was admitted to an Australian general hospital on July 8, 1944, suffering from a primary attack of benign tertian malaria. He had spent seven months in New Guinea, and during that time had been taking "Atebrin" as a suppressive measure. He returned to the mainland in March, and continued to take "Atebrin" till the end of April. On July 9 he started treatment consisting of quinine, 30 grains per day for three days, then "Atebrin", 0.3 gramme per day for three days, and then "Plasmoquine Naphthoate", 0.06 gramme, together with quinine, 15 grains for three days.

Before his admission to hospital he had for one day noticed a rash on his legs, and on examination this was found to consist of pink macules on the shins and thighs. The rash was itchy; the next day it had extended to his trunk and become purpuric on his legs. At this stage (July 11) the bleeding time was two and a half minutes, the coagulation time four and a half minutes and the platelet count 210,000 per cubic millimetre.

His temperature was still 100° F. on July 12, the fourth day of treatment, which was unusual. The rash on his trunk was becoming darker, and that on his legs was confluent over the shins. He was treated with calcium lactate, 15 grains three times a day given by mouth.

On July 14 his temperature was still elevated to 99° F. The rash on his legs was fading, but an urticarial eruption appeared on his body, and this was relieved by injections of adrenaline. The leucocytes numbered 21,200 per cubic millimetre, 81% being neutrophilic cells, 11% lymphocytes, 4% monocytes and 3% eosinophilic cells.

On July 7 the Weil-Felix test was performed, in view of the rash and continued pyrexia. His serum agglutinated *Proteus* OXK to 1/30 and *Proteus* OX19 to 1/20; it failed to agglutinate *Proteus* OX2 and *Brucella abortus*. These findings are regarded as ruling out scrub typhus, murine typhus and brucellosis.

On July 19, the last day of his course of malaria treatment, he complained of general malaise, and his temperature was 99.5° F. He began to hiccup during the day, sporadically at first, later continuously.

On July 20 he was still suffering from persistent hiccup, and this did not respond to administration of iodine, sodium bicarbonate or bismuth. Vesicles commenced to appear in his left axilla and pectoral region. These extended to his chest and back, and down the inner side of his arm, over the area of skin supplied by the second dorsal nerve.

By July 21 he had a typical *herpes zoster* rash, but also vesicles appeared elsewhere on his trunk, on both legs and forearms and on his scalp. These came in crops at intervals of a day and were typical of a varicella eruption. The hiccups were persistent and distressing, ceasing only when he slept for an hour or two; morphine (one-quarter of a grain) and atropine (one-fiftieth of a grain) given by injection produced relief lasting up to three-quarters of an hour, and other sedatives such as "Nembutal" and chloral and potassium bromide were no more successful.

Injections of pituitrin (one cubic centimetre once a day) were commenced on July 21, with little alteration in his condition. Intermission of the hiccups gave him sleep for two or three hours at the most; no relief was obtained by breathing into a paper bag for a quarter of an hour, although he became hyperpneic. Administration of "Carbogen" was without effect.

At night paraldehyde in doses of two drachms, repeated once, gave him some sleep. It was decided that to relieve the diaphragmatic spasm it would be necessary to inject the phrenic nerve, and in preparation for this he was examined under the X-ray screen; it was found that both sides were equally affected by spasm. Before operation became necessary, the hiccups lessened and ceased altogether on July 27, having lasted in all eight days.

On July 29 a lumbar puncture was performed; the cerebro-spinal fluid was under normal pressure, and contained thirty lymphocytes, two monocytes and seven polymorphonuclear cells per cubic millimetre. The total protein content was thirty milligrammes *per centum*.

On August 5 the vesicles were dry. He still had elevations of temperature to 99.5° F., and complained of a dull pain in the region of the herpes rash. Anaesthesia was present over this area.

His condition rapidly improved, but one month later he was still complaining of some pain in the area affected by the herpes.

Comment.

The diagnosis of malaria was made at the hospital on the findings in a thick blood film stained by Field's method. *Herpes zoster* and varicella are thought to be due to the same virus, and a patient with herpes can apparently transmit a varicella infection to contacts. The occurrence of the two conditions together—a fact which has been previously reported a number of times by various observers—would support the unity of the two diseases. Recent reports to this effect appear in the *British Medical Journal* of July 22, August 5 and August 19, 1944.

Aberrant herpes may occur elsewhere on the body than in the area of the sensory neurone affected, but in this case the varicella eruption was generalized and typical in appearance. It is thought that the purpura and the urticaria were probably related to the attack of malaria.

In this case it was not possible to discover whether or not the patient had been in contact with a varicella infection just prior to his admission to hospital. However, in the months of June and July, 1944, there were admitted to the hospital three patients suffering from varicella and three patients suffering from *herpes zoster*.

The persistent myoclonus of the diaphragm, together with the finding of polymorphonuclear cells in the cerebro-spinal fluid, indicates that myelitis was present in addition to radiculitis.

Acknowledgement.

I wish to thank the Director-General of Medical Services for permission to publish this report.

Reviews.

MINOR SURGERY.

R. J. McNEILL LOVE has produced a second edition of "Minor Surgery".¹ Actually he himself seems to have written only one-third of the book. The rest has been revised by able collaborators picked for their special knowledge in various fields. It is written as a guide to hospital resident medical officers and as an aid to practitioners.

In our review of the first edition we stated that it presented no advantages over recognized text-books and fell below the standard set by the author in his "Short Practice of Surgery". That opinion still holds. Most of the material in the book is a duplication of that found in any reliable modern text-book of surgery, and we look in vain for detailed instructions on minor procedures which are often assumed in the larger text-books. To add to the difficulty, the arrangement is not good. The book would be improved by a subdivision of chapters, each covering a compact field. Fortunately the index is adequate.

In his preface the author has anticipated criticisms that some of the sections may be considered as major surgery. However, if the author is unfortunate enough to suffer from a fractured spine or a penetrating injury of the eyeball (subjects considered in this book), we hope his medical advisers will consider the event as more than an occasion of minor surgery. Most of the matter of the book is sound, though there are some oddities in the treatment recommended. We thought that the probang could be found only in museums (page 59), and we have yet to see a patient placid enough for an excision of the eyeball under cocaine (page 244). The printing and illustrations of the book are satisfactory.

MEDICAL POETRY.

THE anthology of the work of poet physicians, compiled by Mary Lou McDonough, is a very pleasant book both "to have and to hold" and also to give to a friend.² It is got up in a generous and dignified style, bearing none of the marks of paper shortage *et cetera* to which we have become so accustomed in these parts and in the books from Britain. The compiler describes it as "a book of medical poetry written by physicians", but at many points she seems to have run into difficulties as to exactly what "medical" poetry is. One is glad that she did not reject Goldsmith's "When Lovely Woman Stoops to Folly" because it is not medical or gynaecological, and that she did not choose some more peculiarly medical fragments instead of those of Keats which she did insert. A very wide range in time is covered, and many names that we had thought of as belonging to poets now turn out to belong to physicians as well. In the more modern section there is a generous representation of American poets, many of whom will not be very familiar to British readers. In this section, too, there are more of the medical poems descriptive of a doctor's work and his reactions to it. Two poems of Sherrington's are notable, and amongst the most modern, Merrill Moore is represented by five of the fifty thousand sonnets he is alleged to have written. This poetic psychiatrist contributes at the end an after-thought or memorandum on medical poets, in which he seems to grant the relative irrelevance to poetry as to whether a poet is a physician or not.

The compiler is in error in her statement about Francis Thompson (1859-1907). We read that: "He studied at Ushaw College near Durham and qualified as a physician at Owens College in Manchester, but gave up his medical work to go to London, where he lived for three years as a pauper in order to write poetry." Thompson did not qualify in medicine. In Everard Meynell's account of Thompson's life we read that for six years he "studied or attempted to study" at Owens College, Manchester. He failed in his examinations on two occasions and then went to Glasgow, "where degrees were more easily, if less honourably, to be obtained". (A

statement hardly fair to Glasgow.) He failed again. "Indeed failure must have been very frankly courted by Francis, whose main fault was that he had not the courage openly to dispute his father's decision in regard to a career." During his student days he had acquired the opium habit, and the statement that he lived in London for three years as a pauper in order to write poetry does not give an accurate idea of the circumstances.

Again, the statement that Sir Henry Head (1861-1940), "the British physiologist", was knighted in 1927 "for his research and its application to flight problems, studies in which he collaborated with Dr. Harry Armstrong and other workers in the United States Army Medical Corps", is scarcely an adequate reference to one of the world's leading neurologists.

That accuracy is not one of Mary Lou McDonough's characteristics is further shown by her reference to Sir Charles Sherrington. We are told that he received the "Nobel Prize in medicine" and that he was awarded the "Knighthip of the Grand Cross of Britain". Actually Sherrington was a Knight Grand Cross of the Most Excellent Order of the British Empire. Silas Weir Mitchell was not admitted to "membership in the Royal Society of England"; he became a Fellow of the Royal Society.

In spite of errors such as those mentioned, the book is a very pleasant companion for occasional reading. Every kind of doctor will find something in it for himself. Even the jaded reformer will note the pioneer of charitable out-patient clinics, Samuel Garth, to have felt the same about things as he:

With just resentments and contempt you see
The foul dissensions of the Faculty;
How your sad sick'ning art now hangs her head,
And once a science, so become a trade,
Her sons ne'er rifle her mysterious store,
But study nature less, and lucre more.

TROPICAL MEDICINE.

"TROPICAL MEDICINE", by Rogers and Megaw, has appeared in a fifth edition.³ As the authors state in the preface, this volume is no larger than the previous one, but the book has been brought up to date and in most sections there are either omissions or additions. The sulphaguanidine treatment of dysentery is discussed, also the modern treatment of malaria with "Atebrin" and "Plasmoquine", which have been so useful in the Pacific war when the quinine shortage has been acute. Mosquito control and clinical prophylaxis and treatment of blackwater fever by gavage are described in some detail. The chapter on sprue has a new section on aetiology. Fairley's intradermal test is described in the chapter on schistosomiasis and Kellaway's method of distal ligatures in the treatment of snake bite. Several pages have been rewritten in the chapters on leprosy and trypanosomiasis.

There are some valuable additional notes on vitamins in the chapter on dietetic diseases, and ariboflavinosis is described in some detail.

Epidemic dropsy is separated from beriberi. The treatment of heat cramp with sodium chloride is also included, and that of louse typhus in mice with penicillin. The book now contains reference to most recent experimental work such as the inoculation of volunteers with kala azar and the good results from the compulsory inoculation of pilgrims with cholera vaccine. In the measurement of the loss of fluid in cholera, the haemocrit is recommended instead of the capillary tube.

Doubt is thrown on certain treatments, such as that with bacteriophage and polyvalent serum. Sulphanilamides have been found useless in malaria, amebic dysentery, undulant fever and cholera. The use of cod liver or whale oil is suggested for tropical ulcer. Most of the lessons in tropical medicine learned in the Pacific war are found in this new edition. Fuller illustrations to demonstrate what may be seen under the microscope would help the isolated novice, as also a description of such a simple procedure as the hypertonic saline method of bringing amebic cysts to the surface.

¹ "Minor Surgery", by R. J. McNeill Love, M.S. (London), F.R.C.S. (England), F.I.C.S.; Second Edition; 1944. London: H. K. Lewis and Company, Limited. 7" x 4 1/2", pp. 398, with many illustrations, some in colour. Price: 15s. net.

² "Poet Physicians: An Anthology of Medical Poetry written by Physicians", compiled by Mary Lou McDonough, 1945. Springfield: Charles C. Thomas; London: Baillière, Tindall and Cox. 10 1/2" x 6 1/2", pp. 228. Price: \$5.00, post paid.

³ "Tropical Medicine", by Sir Leonard Rogers and Sir John W. D. Megaw; Fifth Edition; 1944. London: J. and A. Churchill Limited. 9 1/2" x 6", pp. 527, with illustrations. Price: 21s.

The Medical Journal of Australia

SATURDAY, AUGUST 4, 1945.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

ON POST-GRADUATE TEACHING FOR SERVICE MEDICAL OFFICERS.

Most competent medical practitioners have been students throughout the whole of their professional lives. A few, while still remaining students, are cast for the role of teacher. Some persons tacitly assume that a sound practitioner, especially if he shows brilliance in the technical side of his work, will be a successful teacher. This assumption is as foolish as it is incorrect. There would be error, too, in the view that every practitioner knew how best to apply himself to his post-graduate studies and even how to select the subjects to which he should pay most attention. It is as true of Australia as of every other part of the English-speaking world, that never before have so many medical graduates stood in urgent need of post-graduate teaching and study as at the present time. While the services provide opportunities for useful work to be undertaken by their medical officers, the work is often specialized. Many officers are engaged in the performance of what may be regarded as routine duties, but the most unfortunate from the point of view of the subsequent resumption of active practice are those who, having enlisted in the early stages and possibly coming fresh from resident hospital appointments, have been given senior posts in which administration takes up most, if not all, of the time. Although medical officers have had the best possible opportunities for the training of their powers of observation, it is clear that courses of instruction planned for them will have to cover every subject comprised in the latter years of the undergraduate medical course.

On previous occasions discussions in these columns on the rehabilitation of service medical officers have, in regard to post-graduate teaching, centred chiefly round the ways in which opportunities can be provided for tuition. There are other aspects to be considered, and one of these is the selection of the teachers and their attitude to the work of teaching. A medical teacher

should not differ essentially from any schoolmaster charged with the teaching of boys. His job is to make his pupils think for themselves. Up to a certain point he has to be didactic. When he is teaching graduates he has to remember that they have travelled further on the road of medicine than undergraduates have travelled, though they may have forgotten what parts of the road look like. Medical teachers of graduates can, therefore, and should, be less didactic and more speculative. In proportion as they are able to strike a right balance in this regard will they be likely to achieve their objective of making their pupils think for themselves. Medicine, like anything else, can be taught in a dull, hum-drum fashion. The man who will make a more lasting impression on his pupils, that is to say, will be of most use to them in their education, is the man who is not slave to a method, insisting on vain repetition and intolerable conformity, but who, building on a foundation of known fact, adopts an approach and an outlook that stimulate them to thought and fresh inquiry. Charles Morgan has recently written of schoolmasters that those remembered with admiration and affection are never the flat, dutiful, conforming kind, the slaves of a syllabus, but always the characters, the Landors of the classroom, who took their own way and led their pupils off the map. This is just as true of teachers of medicine. Morgan writes of what he calls the good master that if he is teaching Latin, to be in his class is not to grub for notes, as do the heathen in other classes, but is "to sup with Catullus, to walk with Virgil, to be received among the civilized". The medical teacher visualized in this discussion will invite his guests to a repast as varied and at least as satisfying as that to be found at any other board of everyday life. It is unfortunate that not many of the service officers seeking post-graduate tuition will be able to pick and choose their teachers. A certain number of them will be placed in resident positions at hospitals and will receive the type of training usually given at the respective institutions. Many will attend courses of lectures and demonstrations arranged by universities, post-graduate training committees and other bodies. In these circumstances it is the province of the presiding authority to select teachers and to see that they do their work properly. The statement has been made that practitioners do not always know how to select the subjects to which they should pay most attention. In contradistinction to this it may safely be claimed that practitioners attending courses of instruction will generally be able to determine whether the tuition given by a particular teacher is valuable or not. A few years ago it was customary in connexion with the annual refresher courses held in one of the States to receive a report at the end of each course from each member of the class on the value of the lectures given. It was claimed that by this means dull, unimaginative and uninspiring lecturers were dropped and that the standard of the instruction was raised. Some such arrangement as this might be valuable in the near future.

The success of any scheme of post-graduate teaching for service medical officers will depend in large measure on the kind of teaching that they received in their undergraduate days and on the use that they have made of it. In the *British Medical Journal* of February 5, 1944, F. M. R. Walshe stated that in the present educational system of the medical student no general principles were imparted

to him. This subject has been further discussed in the *British Medical Journal* of April 14, 1945, by D. H. Smyth, who has made an experimental investigation to determine whether medical education is scientific. His investigation was carried out so that it dealt mainly with the preclinical training in physiology, the subject in the course in which he is personally interested. The subjects of the experiment were 54 medical students studying for the second M.B. examination of the University of London. All but two had passed the first M.B. examination by July, 1943. At a sessional examination held three months after they started the study of the second year subjects these students were set the following compulsory question:

Explain briefly what meanings you attach to the following terms, and illustrate these by examples taken from your knowledge of physiology: (a) hypothesis, (b) law of nature, (c) controlled experiment, (d) empirical method, (e) percentage error, (f) inductive and deductive reasoning.

The results of this inquiry are most interesting. Since all readers of this journal also receive the *British Medical Journal*, they will not be quoted in detail. Smyth's conclusion is that a large number of students have only the vaguest ideas on expressions and terms which are in everyday use in scientific work, and which are the basis of the scientific method. He thinks that his findings bear out Walshe's contention that in the teaching of the student there is too much imparting of facts and too little imparting of general principles. Smyth's investigation has important lessons for those who plan post-graduate education. The student at a refresher course, a service medical officer, for example, no doubt is seeking to have brought to his memory once more the details of diagnosis and treatment which have become somewhat vague since he has not been able to practise them. It will be entirely incorrect to make an effort to supply those details merely on the assumption that the general principles on which they are founded are understood and in fact well known. The foundations of a building must be well laid before the superstructure is built upon them. If the foundation has been well and truly laid and the superstructure has not been added or is only partially built because of some prolonged interruption, the foundation should undergo a rigorous inspection before building is continued, lest some flaw has developed in the idle period.

There are other facets to this important subject; their discussion must await another occasion.

Current Comment.

POLIOMYELITIS IN MALTA.

AN unusual opportunity to study an epidemic of poliomyelitis occurred in Malta at the end of 1942. Between November, 1942, and February, 1943, a total of 483 cases occurred on the islands of Malta and Gozo. H. J. Seddon, Thomas Agius, H. G. G. Bernstein and R. E. Tunbridge, who discuss the epidemic, point out that Malta had its first air raid on June 11, 1940, the day after Italy declared war on Great Britain. From then until late in 1942 the island was bombarded "with a remorseless regularity unsurpassed in the history of warfare". The result was that people went to live in tunnels, basements, crypts of churches, caves *et cetera*. In some of these places even the most essential sanitary requirements were lacking and in

others the conveniences that existed were quite inadequate for the number of persons who had to use them. The area of Malta is 95 square miles and of Gozo 27 square miles. The estimated population of the two islands in 1941 was 271,359. In addition there were increasing numbers of sailors, soldiers and airmen. In the summer and autumn of 1942 the supply of food became dangerously low. A severe system of rationing had to be introduced and people no longer had enough to eat. Here were conditions favourable to the occurrence of epidemics. As a matter of fact the tide turned in November, 1942, and the arrival of supplies relieved a desperate situation. It was in the middle of November that the poliomyelitis epidemic started.

During the period 1921 to 1941 only 61 cases of poliomyelitis were recorded in Malta. Prior to November no case had been notified in 1942. The authors of the report do not consider that the 483 cases represent the total incidence. Patients were sometimes seen for the first time in the surgical departments of civilian hospitals suffering from the effects of anterior poliomyelitis; moreover, one of the authors, while acting on a recruiting board, saw "about 20 men" in the eighteen to twenty-three years of age group who were suffering from the effects of the disease. The epidemic reached its peak in the week beginning December 20, when there were 108 cases; by March 1, 1943, it was over. The incidence was heaviest among Maltese children, 82% of the patients falling into this category. Sixty-one persons over twenty years of age were affected; four of these were Maltese and the remainder were service personnel who came from Great Britain. The mortality rate was low among the civilians (3.5%), but among the service personnel it was 19.3%. The way in which service personnel were affected is one of the reasons why the virus causing the epidemic is thought to have been a local strain. It is true that poliomyelitis is endemic in the United Kingdom, but the incidence of the disease among the service personnel of Malta was 2.5%, and not only was the mortality rate high, but the residual disability was considerable. Adult Maltese were almost completely unaffected—no cases occurred among Maltese soldiers. Civilians were first affected. The authors also point out that although poliomyelitis has been endemic in Malta for many years, the number of annual notifications has been small and no outbreak that could be described as an epidemic has ever occurred. In an interesting discussion Seddon and his co-authors deal with the mode of spread. They produce sound arguments against overcrowding as an important factor in spread and they fail to incriminate food, water or flies. They hold that the infection was predominantly of the respiratory type. They are led to this conclusion by the general form of the epidemic wave, by the occurrence of cases in all parts of Malta within a very short space of time, and by the almost simultaneous appearance of the disease in Malta and Gozo. They find the analogy with cerebro-spinal fever strong. Though the infection probably gained access to the naso-pharynx by droplets, they can find no evidence to show by which route the virus reached the central nervous system. The only role left for overcrowding, fatigue and so on is that of predisposing factors, and this is the role cast for them.

LYMPHOGRANULOMA VENEREUM.

THE literature contains many references to the condition known as *lymphogranuloma venereum*. The malady enjoys many aliases, and this has not in the past been of much help to anyone seeking to understand the disease. It has been known as climatic bubo, tropical bubo, *lymphogranuloma inguinale*, *lymphopathia venereum*, *lymphogranulomatose inguinale subaigue*, *Strumosen Bubonene*, *venereal lymphogranuloma*, *lymphogranuloma inguinale venereum*, *granulomatosis lymphatis*, *non-tuberculous granuloma* and *puddental ulcer*. These names are set out in the opening sections of a comprehensive review of the

¹ *The Quarterly Journal of Medicine*, January, 1945.

subject by Herbert Koteen,¹ to which further reference will be made later. A lengthy review of the condition was published by H. S. Stannus in 1933 in a book which he entitled "A Sixth Venereal Disease"; this volume was reviewed in this journal in May, 1944. In this book Stannus collated evidence to show that the group of conditions named (he used the term *esthiomène* and also referred to chronic ulcer and elephantiasis of the genito-ano-rectal region and to inflammatory stricture of the rectum) was due to infection with the same virus. It was the introduction of the Frei test in 1925 that made recognition of the common origin of the several syndromes possible and revealed the condition as a systemic infectious disease. Between the introduction of the Frei test and the publication of Stannus's book two important events should be recorded. The first is the publication of a monograph by F. Fischl in which he reported the etiological correlation of *lymphogranuloma venereum* and the climatic bubo "known as a special syndrome by tropical clinicians for half a century".² The second is the publication in 1929 of a monograph by Hellerström, who "confirmed the theory as to the identity of *lymphogranuloma venereum* and climatic bubo, and reported four cases of *erythema nodosum* occurring in the course of *lymphogranuloma venereum*".³ According to R. D'Aunoy and E. von Haam,⁴ it was in 1931 that Hellerström and Wässén discovered the causative agent. They "succeeded in producing lesions by injecting intracerebrally into certain species of monkeys pus obtained from buboes of patients suffering from venereal lymphogranuloma. From these experimental lesions a filtrable virus was regularly obtained with which the disease could be produced by continued passage in animals". Koteen in the review already mentioned points out that Frei has recently described⁵ the developmental phases in four steps: (i) Proof by Durand, Nicolas and Favre that strumous bubo is a separate venereal disease. (ii) Discovery of the specific test by Frei, which permitted the identification of climatic bubo, rectal stricture and *esthiomène* as the same disease. (iii) Transmission of the disease to animals by Hellerström and Wässén by intracerebral inoculation of monkeys. (iv) Experimental study of the disease as a virus infection.

The first point to be noted in Koteen's monograph (it is a document of 54 pages with 369 references to the literature) is the world-wide distribution of the condition. It is especially prevalent in tropical and subtropical countries, but cases have been observed throughout Europe and North and South America. During recent years infections have been reported in increasing numbers. The increase is held to be apparent rather than real—a growing awareness of the existence of the disease is suggested. In 1939 Favre and Hellerström by means of *questionnaires* from 115 clinics received reports of 10,000 cases from every country in Europe and from parts of North and South America, Java, India and the Far East. These authors comment on the fact that clinicians have but recently learned to recognize the disease. It is found most commonly among persons whose economic and social status encourages sexual promiscuity. Estimates of the incidence of *lymphogranuloma venereum* are based on the results of the Frei or complement fixation testing of groups of persons. Koteen states that, on the assumption that the results of testing are valid, infection with the virus of *lymphogranuloma venereum* is even more prevalent than syphilitic infection, but that in the majority of instances the former remains latent without producing any evidence of tissue damage. In the face of this statement and also of the fact that in most persons reacting to the tests there is no history of infection and no physical

evidence of the disease, it is natural to ask whether more does not remain to be learned about these tests.

Koteen deals at considerable length with the clinical manifestations of the condition. He divides them into those proved by recovery of the causative organism to be due to *lymphogranuloma venereum* and those suspected of being due to this disease. First among the former group come primary genital lesions. The usual form is the herpetiform lesion, as a rule not more than five or six millimetres in diameter, although sometimes larger lesions are seen in women. Often only a minute lesion is seen and frequently none can be found. Occasionally the lesion is situated in the urethra. Next among the "proved lesions" are inguinal buboes. This is the most frequent manifestation in males. A generalized systemic reaction often accompanies invasion of the inguinal glands. After the initial phase of the disease most patients enter a period of latency during which the only evidence of infection can be found in the laboratory. In patients who go on to develop late clinical manifestations of the disease, the constitutional symptoms are variable. The course is like that found in any debilitating illness; it is specially conspicuous in proctitis with stricture and ulceration. The remaining lesions from which the virus has been recovered include *esthiomène*, urethritis, cervicitis, the ano-rectal syndrome, conjunctivitis and meningitis. Koteen explains, in regard to elephantiasis of the external genitals, that, depending on the degree of hyperplasia or necrosis, the genitalia may assume a variety of appearances. There may be elephantiasis with vegetations and polypoid growths. Fistulae occur and may be followed by ulcerations. The lesions may be very painful, particularly after tissue destruction begins, and normal functioning of the parts is impossible. The oedema may extend from clitoris to anus, and as the infection progresses, tissue breakdown may follow. The clinical manifestations attributed to the virus of *lymphogranuloma venereum* comprise also lesions from which the virus has not been recovered. In regard to the following the supporting evidence is good: ulcerative colitis, salpingitis and parametritis, dermatological manifestations, joint and bone involvement, cervical and axillary adenitis, tongue and lip "chancres". In regard to the following the supporting evidence is circumstantial only: pharyngitis and tonsillitis, enteritis, ocular lesions other than conjunctivitis. The laboratory procedures described by Koteen as used in the diagnosis of *lymphogranuloma venereum* include skin sensitivity tests (the Frei test performed, as originally, with human pus or with other antigens), a complement-fixation test, the inverted Frei test, the intravenous injection of a Frei antigen, the histological examination of tissue, the demonstration of neutralizing substances in the patient's serum and the isolation of the causative agent (after the intracerebral inoculation of mice). Koteen insists that no one of the ordinary laboratory procedures permits a definite and categorical diagnosis that a given lesion is due to the agent of *lymphogranuloma venereum*. "At best, it may establish the fact that the patient now has or once had the infection." The diagnosis can be established only by consideration of the history and the appearance of the clinical manifestations and by careful evaluation of the laboratory findings.

From these considerations it will be agreed that Koteen is justified in his final conclusion that some of the clinical manifestations at present ascribed to the causative agent will prove to be incorrectly associated with it, and that in all likelihood hitherto unexplained entities may be shown to be initiated by the agent. This contention is of particular interest when we realize that the virus of *lymphogranuloma venereum* has an undetermined relationship with other viruses. Koteen quotes the work of several investigators in support of the view that in all probability some group antigenic relationship exists among the agents of *lymphogranuloma venereum*, psittacosis, inclusion blenorrhoea conjunctivitis, mouse meningoencephalitis, and some agents capable of producing atypical pneumonia. Thus Frei's fourth developmental phase in the study of this disease is by no means circumscribed, and new knowledge may come from unexpected quarters.

¹ Medicine, February, 1945.

² F. Fischl: "Lymphogranulomatosis Inguinalis". *Handbuch der Haut- und Geschlechtskrankheit*, Volume XXI, 1927; quoted by T. Benedek and D. B. Olkon, *American Journal of Syphilis, Gonorrhea and Venereal Diseases*, Volume XXV, 1941, page 28.

³ Sven Hellerström: "A Contribution to the Knowledge of Lymphogranuloma Inguinale"; quoted by Benedek and Olkon, *loc. cit.*

⁴ *Archives of Pathology*, Volume XXVII, 1939, page 1032.

⁵ *The Journal of the American Medical Association*, Volume CX, 1938, page 1653.

Abstracts from Medical Literature.

BACTERIOLOGY AND IMMUNOLOGY.

Slide Agglutination and Precipitin Methods for the Typing of Streptococci.

CAROLYN H. HILLES AND MORTON HAMBURGER, JUNIOR (*The Journal of Infectious Diseases*, November-December, 1944), have described their experiences with the slide agglutination and the capillary precipitin methods for the typing of hemolytic streptococci. One hundred and sixty-nine cultures could not be typed by the slide method on account of granularity or of spontaneous agglutination, and of cross reaction between the members of 15-17-18-19-23-30 complex. Often cultures had to be subcultured eight times before a reaction could be obtained. The same cultures were tested with the capillary precipitin method when sera were made available by Mrs. Lancefield, and all were identified. The authors stated that the sera were absorbed with a heterologous serum to remove the common carbohydrate antigen, and then the streptococci reacted with their M substance, rather than by the T substance. The test produced a reaction the first time it was applied and it eliminated difficulties due to granularity of cultures.

Poliomyelitis Virus in Non-Contacts.

JOHN F. KESSEL AND FREDERICK J. MOORE (*American Journal of Hygiene*, January, 1945) have investigated the occurrence of poliomyelitis virus in the tonsils and stools of non-contacts during an inter-epidemic period. They made a preliminary survey of the efficiency of the intranasal method of inoculating monkeys as compared with the intracerebral route, using virus diluted 1 in 100 and 1 in 1,000. The intranasal route gave satisfactory results with the stronger virus only, and ether treatment of emulsions reduced their infectivity. A survey was made of 136 individuals who had no known contact with the disease and who had had their tonsils removed. Specimens of stool were obtained and tonsils and stools were used in groups from three individuals. Virus was obtained from three pools. During the true inter-epidemic period no positive results were obtained; from May to September positive results were obtained, and in October an epidemic developed in the city, so that all positive results were correlated with the weeks immediately preceding the outbreak.

Chlorination of Poliomyelitis Virus.

JAMES D. TRASK, JOSEPH L. MELNICK AND HERBERT A. WENNER (*American Journal of Hygiene*, January, 1945) have examined the viricidal effect of chlorination of human, monkey-adapted and mouse strains of poliomyelitis virus. Four different strains were used and treated with varying measured amounts of sodium hypochlorite for ten-minute periods, and then monkeys were inoculated with the mixtures. In two instances the presence of 0.4 part per million of free chlorine failed to

inactivate the virus and a 10% stool suspension-virus mixture was not inactivated by treatment giving residual values of fifteen parts per million. Chloramid and azochloramid were also tested against mouse adapted strains, and here 57 parts per million of free residual chlorine were necessary to reduce infectivity from chloramine, and 12.1 parts per million of azochloramid. When organic matter was added, the chlorine had to be raised considerably to inactivate a similar amount of virus. This shows the need for caution in the application of quantitative experiments of this nature to the effects to be expected from chlorination under natural conditions.

Carbon Dioxide Tension for the Gonococcus.

WILLIAM FERGUSON (*American Journal of Syphilis, Gonorrhea and Venereal Diseases*, January, 1945) has made a study of the optimal carbon dioxide tensions necessary for the primary isolation of the gonococcus. It was found that the emergency method of burning a candle in a closed container was as efficient as the provision of 10% carbon dioxide delivered from a tank, so a large series of tests was set up to investigate the reason of this. All material was carefully collected in ascitic fluid, diluted in series and volumes of 0.1 ml spread on the surface of chocolate agar plates, which were then incubated under test conditions of carbon dioxide tension and moisture content. It was found that an increase in atmospheric moisture almost to saturation point combined with a variable increase in carbon dioxide tension gave satisfactory growth of gonococci in primary isolation, and that the numerical population far exceeded that of cultures made similarly, but incubated aerobically without any provision for increased moisture. Tests were made with hydrogen, carbon monoxide and nitrogen, but increases in their concentrations had no stimulating effect on the growth of the gonococcus.

Synthetic Medium for Sulphide-Forming Bacteria.

R. W. NEWMAN (*The Journal of Laboratory and Clinical Medicine*, January, 1945) has produced a synthetic medium for determining bacteria which utilize citrate and form hydrogen sulphide. Genus *Aerobacter* can use citric acid as a source of carbon, *Escherichia coli* cannot. Most of genus *Salmonella* can form hydrogen sulphide on peptone media, while *Aerobacter* cannot. Iron can be used as an indicator of hydrogen sulphide formation. These principles were utilized in the production of a synthetic medium containing ferric ammonium citrate, sodium sulphite and sodium thio-sulphate in addition to nutrient salts and 2% agar. The pH was 7.0. It was tubed in amounts to give a solid butt and a slanting surface. The test organism was inoculated over the surface and into the butt. The surface growth is yellowish against the agar, while the butt steadily blackens if the organism reduces the iron. The great majority of *Salmonella* cultures tested produced blackening, and utilized the citric acid, while paracolon organisms grew luxuriantly on the surface of the medium only, and so-called "pseudo" strains grew in the depths of the

medium. *Escherichia coli* did not grow at all on the medium. The Newcastle strain of *Salmonella* produced a small amount of hydrogen sulphide, as did *Escherichia freundii*. The author thinks that the medium will prove useful in the differentiation of these types of organism.

Coagulase Activity of Staphylococci.

J. DOUGLAS REID AND RANDOLPH M. JACKSON (*The Journal of Laboratory and Clinical Medicine*, February, 1945) have developed an improved method for determining the coagulase activity of staphylococci by means of a plasma agar plate. This was done in order to avoid the necessity for stocks of sterile plasma and frequent dilutions of it, as the plasma agar plates could be prepared in bulk and stored. The medium was a 2% veal-agar infusion to which after melting and cooling was added 20% of sterile plasma before the plates were poured. After inoculation with staphylococci and overnight incubation at 37° C., the colonies showed a grey halo of variable diameter, which did not appear on serum agar plates. The halo was often visible after a few hours if heavy inocula had been used, and in some strains which were known to be hemolytic, further incubation produced a clear zone within the halo, but this was variable. Plates were still satisfactory after two weeks' storage. A comparative study of 82 strains of staphylococci was made, and all those isolated from lesions produced coagulase both by plate and tube methods, and all those from other sources did not yield the reaction.

The Kahn Test.

A FRACTIONAL supplementary test for distinguishing Kahn reactions in syphilis and malaria has been described by A. Rosenberg (*The Journal of Laboratory and Clinical Medicine*, February, 1945). The author found that by fractional precipitation of the serum protein with ammonium sulphate the first sample brought down from syphilitic serum reacted strongly to the Kahn test, while a similar sample from malarial serum did not. Modifications of the quantitative method of the Kahn test were then elaborated, and quantities to give an exact test were determined, and a series of sera from malarial patients were tested. The first precipitate redissolved and tested yielded only 3.2% of positive results, while from the whole serum there were 100% of reactors. When the sera were from syphilitic patients, 100% of both the whole serum and the first precipitate samples reacted equally. The author considers the test suitable to be incorporated in any laboratory which is equipped for the routine performance of the Kahn test.

Thymol in Experimental Tuberculosis.

RALPH MCBURNEY, LOUISE EASON AND H. B. SEARCY (*The Journal of Laboratory and Clinical Medicine*, January, 1945) have tested the effect of the oral administration of thymol on experimentally induced tuberculosis. Fully grown healthy guinea-pigs were inoculated subcutaneously with a human strain of *Mycobacterium tuberculosis*. Thymol was given daily to the test animals, and controls were not treated; uninoculated controls treated with thymol were also included. The strain of organism was lethal to

guinea-pigs after eight weeks in doses of one milligramme. The inoculated controls all died within fifteen weeks, while 20% of the test animals survived till twenty-eight weeks, when they were killed. They showed a minimal amount of tuberculosis. Histological examination of the tissues of the control animals receiving thymol alone furnished evidence of some toxicity in liver and spleen and kidney. The dosage of thymol given to a guinea-pig was in the order of 15 grammes of thymol per 100 pounds of body weight. The authors believe that this form of medication deserves further trial.

HYGIENE.

A Cheese-Borne Outbreak of Typhoid Fever.

A. R. FOLEY AND E. POISSON (*Canadian Journal of Public Health*, March, 1945) state that in February during ten days 23 cases of typhoid fever were reported at Victoriaville, Quebec. The range of patients' ages was five to sixty-seven years and the cases were evenly divided between the sexes. Eleven patients were factory girls. This fact led to the finding of an infected Cheddar cheese. Some of this cheese used up at Windsor, Ontario, gave rise to 29 infections. The only food common to the series and both towns came from one contaminated vat of cheese late in December. At this time the cheese-maker's wife had an illness thought to be influenza. Her stools proved to contain typhoid bacilli. It is clear that cheese should be made from pasteurized milk or held for a minimum ripening period of three months.

Destruction of Water-Borne Cysts of *Entamoeba histolytica* by Synthetic Detergents.

G. M. FAIR *et alii* (*American Journal of Public Health and the Nation's Health*, March, 1945) state that the cysts of *Entamoeba histolytica* in water have been shown to be most resistant to chemical disinfection by the synthetic detergents tested. The cationic type were effective. Fixanol, sapamine, Nopco-QCL and ceepryn were effective cysticides in strengths of ten parts per million in thirty minutes to thirty parts per million in ten minutes—much more effective than neutral hexylresorcinol. Anionic types were of little value. The hydrogen ion concentration has little influence and the water seemed to foam more easily and gave an appearance of sliminess. The use of these cysticides in the treatment of utensils, the cleansing of vegetables and fruits eaten raw, treatment of shell-fish, the disinfection of sand filters, all seem possible.

The Distribution of Poliomyelitis Virus in the Environment of Sporadic Cases.

H. E. PEARSON AND R. C. RENDTORFF (*American Journal of Hygiene*, March, 1945) have studied five separate cases of poliomyelitis. They searched for virus the stools of house inmates and the patients' playmates, of the neighbours and villagers, of animals around the house, together with any rats or mice caught, pools of insects—bugs, houseflies, blowflies, mosquitoes *et cetera*—milk, water, as circumstances

demand. In one village where an adult had developed poliomyelitis nineteen days previously, faecal specimens were obtained from 124 persons in 38 of 39 families, but only the six-year-old son, who had remained well, had virus in his stool. The results of all other tests were negative. In a small town thirty associates of the patient were tested and virus was recovered from only three—a sibling of five and two playmates five and seven years old. Four other sporadic cases were investigated with completely negative results. No evidence was found that the infection in sporadic cases is prevalent in the community.

Mortality Reductions in Ontario, 1900-1942.

N. E. MCKINNON (*Canadian Journal of Public Health*, December, 1944) publishes a table and graph giving the specific age death rates over forty-two years of experience. At fifty years and over the improvement is negligible. Passing from fifty to the first year of life definite improvement is seen, at least one-third at forty to forty-nine and two-thirds at all ages under thirty. As activities of health departments are of relatively recent origin, the outlook should improve. In spite of the clamour about heart disease and cancer the old-age group still holds its own.

The Distribution of Poliomyelitis Virus in a Small Town.

H. E. PEARSON AND R. C. RENDTORFF (*American Journal of Hygiene*, March, 1945) state that in a town of 1,350 people no cases of poliomyelitis had been noted in twenty-five years, though a few had occurred in the county every year. Two cases were reported in 1942. Stools were taken from all children under sixteen—282 in all in 146 families. Rats and flies were trapped. Case I gave negative results. In the second household the brother, aged fifteen, of the patient, aged seven, had had a feverish attack about ten days before and harboured the virus. Two cousins of a family of four who had been on a visit and left a day before the patient fell ill also carried the virus; one had slept with him. In eight other families a child was found with virus; five were under two years of age. All except one child were playmates or schoolmates of the original patient or of an infected contact. In twenty-five other children who lived in the same house as the carriers of virus no virus was found. The town water supply is from deep wells; septic tanks and privies are in use. The milk is pasteurized. It was concluded that personal association was the principal factor involved.

The Distribution of Poliomyelitis Virus in an Urban Area during an Epidemic.

H. E. PEARSON *et alii* (*American Journal of Hygiene*, March, 1945) state that in Texas in 1943, 1,271 cases of poliomyelitis were reported, the chief outbreak being in mid-June to October. Fort Worth had 102 cases in a population of 200,000 as against a yearly average of six. Half the patients were under ten years of age and 56% were males. The weather was very hot and dry. Extensive virus tests were carried out, but nothing was found to indicate sanitary defect in water, milk or food supplies. No privies or septic tanks

exist. Flies were few and extra-human tests generally gave negative results. Virus findings became more frequent as an infected household was approached, the patient thus marking a focus of infection. The high proportion of adults infected among household associates suggests that the adult carrier introduces the infection into the family. In those most associated with affected persons, virus was most often found in the stools and the carrier state was most persistent. Stools from 524 tested for virus showed that six out of eight households, representing 27 familial contacts, gave positive findings; of 45 households with 80 non-familial contacts, eight gave positive results, but only two of 127 households with 374 non-contacts. No virus was recovered from water or sewage or from flies, ants, cockroaches or animal droppings, mice or rats. A paralyzing agent was found in a pool from the intestines of 22 Norwegian rats.

Laboratory Criteria of the Cure of Typhoid Carriers.

R. F. FEEMSTER AND H. M. SMITH (*American Journal of Public Health and the Nation's Health*, April, 1945) state that in Massachusetts removal of the gall-bladder from typhoid carriers has resulted in cure in 90% of cases. Sixty-eight carriers were submitted to gall-bladder operations and 63 cures were obtained. Medical treatment with sulphonamides cannot be relied on to effect a cure. The gall-bladder should be established as the focus before operation. The criterion of cure should consist of "negative" stools for not less than twelve months, and this should be followed by the recovery of at least one "negative" specimen of bile. Cholecystectomy remains the only effective means of curing typhoid carriers.

Jaundice following Yellow Fever Vaccination.

J. M. HAYMAN, JUNIOR, AND W. A. READ (*The American Journal of the Medical Sciences*, March, 1945) have made clinical observations on an outbreak of jaundice following yellow fever vaccination. The observations were made between April 6 and September 30, 1942. The number of records available for study was 398. In 183 cases the dates of vaccination and of the appearance of jaundice were accurately known; the mean interval between the two events was 109.1 days. The symptoms were indistinguishable from those of infective hepatitis, but the onset was more insidious. The mean interval between onset of symptoms and the appearance of jaundice was 7.2 days. Fever occurred in 17% of cases and albuminuria in 18.5%. The leucocyte count, the differential leucocyte count and the sedimentation rate were normal. The mean maximum icteric index was 64.4. The cephalin flocculation test gave a positive result in every one of the 220 cases in which it was performed; it was a valuable guide to progress. Bile was present in the duodenum in fifty cases in which intubation was carried out; this was done in all stages of the disease. There was no evidence that biliary obstruction was a factor in the production of jaundice. There were two deaths in the series. In severe cases glucose was of value in treatment. Convalescence was as a rule prolonged

British Medical Association News.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held on May 24, 1945, at the Royal Prince Alfred Hospital, Sydney. The meeting took the form of a series of clinical demonstrations by the members of the honorary medical staff of the hospital.

Ollier's Disease (Multiple Exostoses).

DR. NORMAN C. CUNNINGHAM showed a child, aged three years, a first infant, whose parents were each aged thirty-six years. The child had first been examined nine months earlier. The mother had noticed "lumps" on the ribs from the age of six months. The birth weight was seven pounds two ounces and growth had been normal since. The child's health appeared to be normal. Multiple exostoses could be felt on many bones, but especially at the costo-chondral junctions of the ribs and along the vertebral margin of the scapula. X-ray examination revealed osseous irregularities of both scapulae, mainly along the vertebral edge; irregularities were also present in the anterior portions of some of the ribs on either side of the chest, and in the upper ends of the diaphyses of both humeri. A similar condition existed in the lower ends of the radius and ulna on either side, and also in the lower ends of both femora and in the upper ends of the bones of the leg and in the lower end of the right tibia. The condition was diaphyseal achalasia or multiple exostoses. There was no evidence of nutritional disease.

Dr. Cunningham said that the tumour was a benign form of osteochondroma, and growth usually ceased at about the age of twenty years. Excision was indicated if pressure occurred on neighbouring nerves or arteries or if the tumour interfered with the movement of neighbouring bone. Operation should be delayed until adult life if possible. The prognosis as to life was excellent, and malignant changes were rare. The disease was congenital and hereditary, often affecting several members of a family.

Non-Parasitic Elephantiasis.

Dr. Cunningham's second patient was a child, aged thirteen months, the second child of the family. The mother had noticed three months earlier that the baby's left arm was fatter than the right; it had since increased in size. The baby had been well otherwise, and the weight was increasing normally. The birth weight was eight pounds four ounces; after an eleven-hour labour an instrumental delivery was necessary. The left side of the abdomen appeared more prominent than the right. Dr. Cunningham said that the baby was to be investigated further. An interesting fact was that the elder sister, aged three years, had an extensive hemangioma of the left hand and forearm.

Patent Ductus Arteriosus.

The third patient shown by Dr. Cunningham was a female, aged five years, who had been first examined two years earlier when her complaint was lack of appetite, breathlessness on moderate exertion and failure to gain weight. No cyanosis was present. The blood pressure was 80 millimetres of mercury (systolic) and 55 (diastolic); after exercise the figures were respectively 85 and 45 millimetres of mercury. She was found to be normal except for her cardio-vascular system. The heart was normal in size, but a systolic thrill was present at the pulmonary area, and a loud "machinery" murmur was heard throughout systole and diastole. X-ray examination revealed considerable exaggeration of the pulmonary conus, but a normal-sized heart. Fluoroscopic examination revealed the "hilar dance" phenomenon and increased hilar shadows on both sides due to enlargement of the smaller pulmonary vessels. Fluoroscopic examination from the right anterior oblique angle revealed an enlarged left auricle. The electrocardiogram was normal.

Dr. Cunningham said that, as the child had not progressed physically in the past two years, it was proposed to submit her to operation for ligation of the *ductus arteriosus*: the operation had a mortality rate of 5% to 10%. The three indications for operation were the following: (i) hypertrophy of the heart and early cardiac failure, due to this burden of the passage of blood from the aorta to the left branch of the pulmonary artery; (ii) retardation of physical development due to the poor arterial supply to vital organs, a large amount of blood being diverted to the pulmonary

artery via the patent ductus; (iii) the presence of *Streptococcus viridans* septicæmia, due to an infected ductus. The prognosis for the child seemed to be excellent, and she was to have her operation within the next fortnight.

Patent Interventricular Septum and Probable Pulmonary Stenosis.

Dr. Cunningham finally showed a female child, aged three years, who had a systolic thrill over the second left intercostal space accompanied by a systolic murmur; however, the causation and prognosis were different from those in the case of patent *ductus arteriosus* to which Dr. Cunningham had just referred. Dr. Cunningham said that he first examined the baby at the age of twelve months. There were no symptoms, but the mother had been told that her baby had "a slight murmur in the heart". Attacks of cyanosis, lasting a few minutes only, had occurred when the baby had been crying. The child had been subject to several attacks of bronchitis.

On examination of the child, the heart was normal in size, but a systolic thrill and systolic murmur were present, most pronounced at the pulmonary area. The pulmonary second sound was weak. This indicated the presence of pulmonary stenosis. The presence of cyanosis, which had become more pronounced and lasted longer during the past two years, indicated a patent interventricular septum with a shunt of blood from the right to the left ventricle. The thrill and murmurs had varied somewhat, and were sometimes most pronounced over the centre of the sternum. The prognosis was poor.

Perinephric and Subphrenic Abscesses.

DR. S. L. SPENCER showed a male child, aged seven years, suffering from perinephric and subphrenic abscesses. The child had first become ill on March 31, 1945, with continuous vomiting and severe epigastric pain. He had also an unproductive cough lasting for one week. He was admitted to hospital on April 8. His temperature was 100° F. A blood count showed that the hæmoglobin value was 11.0 grammes per centum (75% of normal); the leucocytes numbered 13,000 per cubic millimetre, a neutrophile leucocytosis being present. In January, 1945, the patient had suffered from bronchopneumonia and peritonitis.

On examination of the child, tenderness and rigidity of the upper part of the abdomen were found, more pronounced on the right side. Tenderness was present in both loins. Some tenderness was elicited on rectal examination; no mass was present. Diminished vocal fremitus was present at the bases of both lungs, more pronounced on the right side. The percussion note was hyporesonant on the right side. The urine was found to contain pus cells, organisms, granular casts and red blood corpuscles. An X-ray examination on April 11 revealed enlargement of the area of liver dullness and displacement of the hepatic flexure. The administration of penicillin was followed by a fall in temperature and pulse rate; 470,000 units of penicillin were administered.

Carcinoma of the Colon and of the Right Breast.

Dr. Spencer next showed a female patient, aged fifty-eight years, who had been admitted to hospital on April 1, 1945, with a history of constipation extending over fourteen days. During the fourteen days prior to her admission to hospital she had noticed severe borborygmi, some swelling of the abdomen, vomiting and colicky abdominal pains.

On examination of the patient, the abdomen was distended, and slight tenderness was present in the left iliac fossa. No masses were palpable. There was an advanced carcinoma of the right breast. No abnormality was detected in the other systems.

At operation on April 1 the abdomen was opened through a mid-line incision and a carcinoma of the sigmoid colon (ring type) was found. A transverse colostomy was performed. At a further operation on April 23 the portion of intestine containing the carcinoma was resected and a Murphy's button was inserted. Pathological examination of the growth showed it to be a columnar-celled carcinoma.

Staphylococcal Septicæmia Treated with Penicillin.

DR. B. DENNING showed a female patient, aged fourteen years, who had been admitted to hospital on February 21, 1945. Nine days previously a small boil had developed on the patient's left cheek, which was treated with ichthyol. This boil cleared up in five days; but a group of small boils appeared on the right cheek and these did not "come to a head". Four days prior to her admission to hospital the

patient became hot and feverish. One day later she developed generalized pain in the left leg, which she could not put to the ground. One day later again she became tender all over, was mentally confused and was subject to diplopia.

On examination of the patient a small healed boil was present on the left cheek. There was a large, red, indurated area on the right cheek two inches in diameter. The patient was incoherent and unable to reply to questions, talked irrationally and seemed unaware of her surroundings. Cyanosis was pronounced. Her temperature was 104° F. and her pulse rate 120 per minute. The patient was given penicillin, 15,000 units, by intramuscular injection every three hours, with sulphadiazine, two tablets, every four hours. Her general condition gradually improved; the pulse rate and temperature fell to normal in seven days; her general condition was normal seven days after her admission to hospital. The following hematological findings were recorded:

Hematological Findings.	Day of Admission.	Third Day.	Sixth Day.	Twelfth Day.
Red blood corpuscles	4,180,000 per c.mm.			
Hæmoglobin value ..	12.0 grammes per centum (83% normal)		10.6 grammes per centum (72% normal)	12.3 grammes per centum (85% normal)
White blood corpuscles	7,200 per c.mm.	10,900 per c.mm.	24,000 per c.mm.	8,500 per c.mm.
Band forms	19 per c.mm.	30 per c.mm.	15 per c.mm.	
Segmented forms ..	69 per c.mm.	51 per c.mm.	71 per c.mm.	
Total neutrophile cells	88 per c.mm.	81 per c.mm.	86 per c.mm.	73 per c.mm.
Lymphocytes	11 per c.mm.	15 per c.mm.	14 per c.mm.	26 per c.mm.
Monocytes	1 per c.mm.	4 per c.mm.		1 per c.mm.

A specimen of blood, taken on the day of the patient's admission to hospital, yielded a growth of hemolytic *Staphylococcus aureus* (coagulase-positive).

Ruptured Ileum.

Dr. Denning next showed a male patient, aged forty-two years, who on the night before his admission to hospital (on January 27, 1945) was at a beer party, at which he thinks he was kicked in the abdomen. After walking home and going to bed, he awoke at 6 a.m. with severe generalized abdominal pain, more pronounced in the lower part of the abdomen, and not aggravated by movement; but he could obtain no relief. The pain persisted for fifteen hours, at which time the patient was admitted to hospital (10 p.m.). On the night of his admission the patient also complained of burning pain at the end of the penis on micturition. At 10 a.m. the patient had an attack of sweating and giddiness. No vomiting occurred.

On examination of the patient, generalized rigidity of the abdomen with tenderness was present, more pronounced in the region of the left iliac fossa. There was no distension. The pulse rate was 110 per minute. The systolic blood pressure was 130 millimetres of mercury and the diastolic pressure 88. Laparotomy was performed the next day (January 28). The peritoneal cavity contained a large amount of turbid, blood-stained fluid. Adherent bowel was palpated below the abdomen, and a right paramedian infra-umbilical incision was made. Severe peritonitis, fluid, and a perforation a quarter of an inch in diameter were observed. After the gut had been sutured, ten grains of sulphonamide powder were sprinkled into the cavity and the wound was closed. A drainage tube was inserted.

Ectopic Thyroid Tissue Simulating Hodgkin's Disease.

The next patient shown by Dr. Denning was aged nineteen years. On admission to hospital on April 23, 1945, the patient complained of swelling in the right side of the neck, present for six months. The swelling was smaller during rest, larger during work. There had been no interference with swallowing, and the weight had remained constant.

On examination, the patient was pallid, and a swelling was visible in the right side of the neck. Enlargement of the cervical glands along the right jugular vein, extending into the posterior triangle, was observed.

The glands were firm, appeared matted together and were not tender. Glands were palpable in both axillæ and in both groins. The spleen was not enlarged. On the day following the patient's admission to hospital a biopsy of a gland of the posterior triangle revealed a melanomatous-looking gland. Microscopic examination of the specimen revealed (a) hyperplastic aberrant thyroid tissue; many acini were large with many papillary ingrowths; there was no evidence of malignancy; and (b) sinus catarrh of a lymph node.

Fracture-Dislocation of the Spine; Ruptured Kidney; Fractured Ribs and Lumbar Transverse Processes.

Dr. Denning finally showed a male patient, aged thirty-eight years, who had been admitted to hospital on January 10, 1945. Three tons of machinery had fallen on him from a height of six feet. The patient complained of severe pain in the right side of the chest, made worse by deep breathing. He also complained of pain in the lumbar region, over the right hip and in the right groin (pain in these regions was aggravated by movement). One hour after injury hæmoptysis and hæmaturia occurred. Later, the patient could not micturate. The duration of symptoms was three hours.

On examination of the patient, impaired movement of the chest on the right side, a pleural friction rub and bone crepitus were observed. Discontinuity of the eighth, ninth and tenth ribs on the right side and pain over these ribs on antero-posterior pressure were present; there was also

a tense, bluish swelling in the right loin and the right side of the back. Catheterization yielded seven ounces of blood-stained urine. Some distension and considerable rigidity of the abdomen were present, especially on the right side. There was also tenderness on pressure over the lower lumbar spines; no obvious deformity was observed, but intense pain occurred in the right loin on movement. The intravenous administration of one litre of serum was started immediately; catheterization at first produced no urine. Vomiting began on the second day and ceased on the fifth day. An indwelling catheter was connected to Duke's apparatus on the fifth day; there was then no blood in the urine. On the sixth day a plaster jacket was applied. In one month the patient was able to walk by himself. He was discharged from hospital in the fifth week after his admission.

Chronic Frontal Sinusitis with Fistula: Possible Osteomyelitis.

Dr. H. J. EISENBERG showed a female patient suffering from chronic frontal sinusitis with fistula and possible osteomyelitis. The history dated from an attack of erysipelas two and a half years earlier. An "abscess" formed in the frontal area, and had discharged through a sinus below the left supraorbital margin for about eighteen months. About nine months earlier a swelling developed in the left frontal region. Incisions were made by the patient's local doctor, and penicillin was used locally and intramuscularly without effect. Subsequently a radical operation was performed on the frontal sinuses, through a "spectacle" incision. The bone was extensively diseased, but the necrosis appeared to be localized and was on the right side. The sinus was found to be shallow; hence the absence of gross disfigurement. Penicillin was again used locally and intramuscularly during convalescence. Dr. Eisenberg said that so far there had been no recurrence.

(To be continued.)

NOTICE.

THE General Secretary of the Federal Council of the British Medical Association in Australia has announced that the following medical practitioners have been released from full-time duty with His Majesty's Forces and have resumed practice as from the dates mentioned:

Dr. J. P. Findlay, 143, Macquarie Street, Sydney (July 2, 1945).

Dr. A. L. Carrodus, 195, Macquarie Street, Sydney (June 11, 1945).

Medical Societies.

MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held on April 11, 1945, at the Children's Hospital, Melbourne, Dr. E. PRICE, the President, in the chair. Part of this report appeared in the issue of July 28, 1945.

Pulmonary Hydatid Disease.

Dr. J. W. GRIEVE showed a male child, aged five years and five months, suffering from hydatid disease of the right lung, complicated by empyema and pneumothorax. The child lived on a farm in the country, where he was wont to play with dogs and other animals. The other members of his family remained in good health. He had always been well until January 5, 1945, when a bucket of cement fell on his right shoulder, causing considerable bruising. Eight days later he complained of pain in the chest and abdomen and of severe dyspnoea. He vomited several times. He was taken to hospital, where it was thought that he had a right pneumothorax. He was given "M & B" tablets for a "swinging" temperature. On February 3, 1945, he was discharged from hospital. His general condition was satisfactory, though he had a partially collapsed right lung. On February 11, 1945, he was seen by a private doctor, and his chest was considered to be normal. The child had been well and suffered no dyspnoea. During the next four weeks he gained in weight and seemed well. He was admitted to the Children's Hospital on March 25, 1945, for further investigation.

On examination, the patient was a healthy looking boy. The throat was clear, the heart appeared normal, and examination of the chest showed movement to be good and equal on both sides. The percussion note was dull at the base of the right lung. The breath sounds were diminished over the lower lobe of the right lung. There were no adventitious. No abnormality was detected in the abdomen. The Mantoux test (1/1,000 solution) produced no reaction: the Casoni test failed to produce a reaction. A blood examination revealed that the leucocytes numbered 21,200 per cubic millimetre, 69% being polymorphonuclear cells, 25% lymphocytes, 5% monocytes, and eosinophile cells 1%. An X-ray examination of the chest on March 27, 1945, revealed a large cavity, with an irregular area of opacity of low radiographic density occupying its floor, in the right mid-zone, extending towards the base of the right lung; the appearances were consistent with a collapsed hydatid cyst. Adhesions were present at the base of the right lung, and pleural thickening (with perhaps a thin layer of fluid) extended from the base to the apex. The left lung was radiographically normal. The cardio-vascular shadow, which was of normal size, was not displaced.

The hydatid complement-fixation test produced a positive reaction. The chest signs remained unchanged till April 1, 1945, when a "swinging" temperature developed. Examination of the chest at this stage revealed a dull percussion note and absence of breath sounds over the right lower quadrant of the chest. The apex beat of the heart was shifted to the left of the nipple line. A course of sulphadiazine treatment was commenced. Two days later there had been no improvement and the chest signs were as before. Aspiration of the right pleural cavity was proceeded with, and nine cubic centimetres of turbid fluid were obtained. An X-ray examination on April 4 revealed a pneumothorax causing collapse of the upper lobe of the right lung, and a pleural band extending to the middle of the clavicle. Some fluid and air were present in the lower part of the right side of the chest, under considerable pressure, and displacing the mediastinum to the left. Sulphadiazine treatment was discontinued and a course of penicillin was commenced. Cultural investigation of the fluid aspirated from the pleural cavity produced no growth of microorganisms, and in a smear no organisms were seen. However, a fairly large number of polymorphonuclear leucocytes were present. The child's general condition steadily improved. On April 9 examination of the chest revealed a dull percussion note and absence of breath sounds over the right lower quadrant of the chest. The percussion note was tympanitic in the right posterior axillary line. The Casoni test was repeated and still produced no reaction.

Dr. Grieve said that it was apparent that the child had a hydatid cyst which had ruptured. It was probable that the

removal of the remains of the cyst was indicated. The problem was when this could best be accomplished.

Dr. H. DOUGLAS STEPHENS said he thought that it would be good to open and drain the abscess and pneumothorax early. The condition had not responded to chemotherapy. Septic absorption was proceeding. No harm would follow the operation. Closed drainage might be preferable.

Dr. Grieve, in reply, thanked the various speakers for their remarks. He said that the child had been sent to hospital with the view that the condition was suitable for surgical attack, but complications had interfered with this plan. However, Dr. Grieve still thought that it was a surgical problem to evacuate the hydatid cyst and drain pus from the pleural cavity.

A Case for Diagnosis.

Dr. J. W. Grieve's second patient was a boy, aged nineteen months, with purpura and areas of rarefaction in the skull. Dr. Grieve said that it was difficult to classify the condition as a definite entity. Although it had been provisionally called a possible neuroblastoma, he felt that this was not the diagnosis.

The child's parents were Australian born of English descent. The mother's blood failed to react to the Wassermann test; her blood group was O (IV), and her blood was Rh-positive. The father's blood group was A (II), and his blood was Rh-positive. The baby's blood fell into the A (II) group and was Rh-negative. He was born on September 28, 1943. Thirty-six hours after birth he became deeply jaundiced, though his general condition was good. Examination of the blood revealed no deviation from normal. He was discharged from hospital with his mother on the ninth day, when the jaundice had practically disappeared. He was breast fed for four months and then artificially fed. He had mastitis at the age of three weeks and cystitis at six months, and he walked at fifteen months. He was admitted to the Children's Hospital on March 24, 1945, at the age of nineteen months, suffering from coryza and cough, which his mother took to be whooping cough, present for six weeks previously. During that time he was noticed to have become languid and pale, and he refused his meals. The cervical lymph glands became noticeably enlarged. During the last four weeks the pallor had increased, and a petechial rash developed over the body.

On examination of the child, his temperature was 102.4° F. His skin was waxen and he had generalized oedema. A petechial rash covered the body. He was irritable. The liver was grossly enlarged and was palpable three fingers' breadth below the right costal margin. The enlarged spleen extended two fingers' breadth below the left costal margin. Examination of the heart and lungs revealed no further abnormal finding. On March 24 the haemoglobin value was 35%; the leucocytes numbered 10,400 per cubic millimetre, 77% being polymorphonuclear cells, 30% lymphocytes and 3% monocytes. He was given a transfusion of fourteen ounces of blood, of group A (II), but not Rh-negative. There was no improvement after the transfusion. The temperature became elevated, the child became drowsy, and the petechial rash became more pronounced. On March 27 lumbar puncture was carried out. No cells were found in the cerebro-spinal fluid. The protein content was ten milligrammes per 100 cubic centimetres, and the chloride content was 701 milligrammes per 100 cubic centimetres. Microscopic examination of the urine revealed only a few pus cells. Culture from the urine yielded *Staphylococcus albus* only. A further blood examination was made on March 28. The haemoglobin value was 64, and the erythrocytes numbered 3,180,000 per cubic millimetre; the leucocytes numbered 8,400 per cubic millimetre, 69% being polymorphonuclear cells, 20% lymphocytes, 10% monocytes and 1% eosinophile cells. Only an odd platelet was seen in the film. X-ray examination on March 28 revealed that the bones were normal, and there was no evidence of scurvy; the lungs and cardio-vascular silhouette were normal; bony changes were present in the axillary aspect of the right eighth rib; in the skull, multiple small, well-defined areas of bony erosion were observed in the frontal and temporal regions. On April 2 the child was given a second transfusion of blood, again not Rh-negative. The next day his condition was much worse; he was edematous and pale, the temperature was 105° F. and the urine was dark brown. He was not jaundiced. Blood examination on April 6 showed the haemoglobin value to be 60%; the erythrocytes numbered 2,210,000 per cubic millimetre and the leucocytes 10,400 per cubic millimetre, 80% being polymorphonuclear cells, 17% lymphocytes and 3% monocytes.

Examination of a blood film revealed some anisocytosis. The erythrocytes were larger than normal; a few nucleated erythrocytes and an odd platelet were seen.

It was observed at this stage that the child had been given two transfusions of Rh-negative blood, with considerable deterioration in his condition, especially after the second transfusion; this was possibly due to incompatibility of the Rh factor. On April 7 the child was pale and cyanosed; he was given a third transfusion of eighteen ounces of blood, this time Rh-negative, with slight improvement. Congestion was present at the bases of both lungs, and therefore he was given penicillin as a prophylactic measure against pneumonia. Dr. Grieve said that during the past three days the child's condition had been fair. He still had generalized edema and the petechial rash, for which he had been given one cubic centimetre of "Kapilin" per day for the past three days. On April 11, 1945, a further blood examination was made. The haemoglobin value was 39% and the colour index 1.6; the erythrocytes numbered 1,210,000 per cubic millimetre; the leucocytes numbered 6,400 per cubic millimetre, 40% being polymorphonuclear cells, 58% lymphocytes and 2% monocytes. Examination of a blood film revealed some anisocytosis with slight polychromasia. The erythrocytes were larger than normal. Few platelets were seen, but a few nucleated erythrocytes were visualized. On April 11 sternal puncture was performed; no abnormality was detected in bone marrow smears.

DR. LAWRENCE STOKES said that he was intrigued by the unusual Rh findings in this case. It was possible that the father's blood was "Rhrr", in which case only 50% of his offspring would have Rh-positive blood. Dr. Stokes wondered whether the baby showed any evidence of iso-agglutinins in his blood. He understood from Dr. Dougall that Dr. Vera Krieger was investigating the antibodies in the blood of the mother and child. Dr. Stokes asked whether any attempt had been made to determine whether the baby was excreting urobilin and also whether the icteric index was raised.

DR. KATE CAMPBELL said that the Rh findings were not uncommon. An explanation could be offered. The baby's blood might be really Rh-positive, but of a different subgroup from that usually found. There were now six different subgroups, and testing sera were not available for all the subgroups. Dr. Campbell asked whether one could anticipate any after-effects, especially in regard to liver function. Cases had been reported also of curious bony changes following *icterus gravis neonatorum*, called "Albright's disease". Bony changes associated with pigmentation of the skin had also been described. Another possibility in this case was the question of pertussis. An outside doctor had diagnosed the disease, though the mother denied it. Severe purpuric eruptions were met with in severe cases of pertussis infection. The blood picture had been characterized by a low platelet count and a high colour index; these findings suggested liver damage, which might have caused metabolic disturbances.

DR. H. DOUGLAS STEPHENS said that syphilis was a possible aetiological factor. The mother's blood failed to react to the Wassermann test, and the reaction of the baby's blood had not yet been determined.

DR. JOHN BEGG said that another explanation might be an obscure malignant condition in the abdomen, with widespread marrow involvement. He recalled a case at the Royal Melbourne Hospital, in which an adult had suffered from carcinoma of the colon; in this case there existed widespread bony metastases.

DR. HENRY SINN said that in his opinion the Rh factor was not involved in this case. He inclined more to Dr. Begg's view that the picture presented was one of widespread involvement of the bone marrow, and most of the signs could be explained on this basis. A number of diseases, but more especially lipid storage disease, might operate in this fashion. The case presented many of the features of Schüller-Christian disease. This possibility should be given serious thought, for if it was correct some amelioration and possibly cure could be affected by deep X-ray therapy.

Dr. Grieve said that the condition was of interest because of the possible involvement of the Rh factor. He thanked Dr. Campbell for her remarks. Dr. Grieve said that he had been exercised in mind as to whether the Rh factor was concerned or whether some primary abdominal condition existed.

Chloroma.

Dr. J. W. Grieve's third patient was a male child, aged four years, who had suffered from mumps, whooping cough

and otitis media at different times in the past. The mother and father were alive and well. His present illness had begun ten weeks earlier, when left strabismus developed and the left eyelid drooped. Both eyes became puffy, and swelling appeared over the right zygoma and the right temporal regions. He was examined by Dr. Mark Gardner, who reported atrophy of the left eye. A swelling then developed over the left temporal region and the left zygoma, and proptosis of the left eye was present. The child's general health was good, though he tired easily, slept badly, and frequently screamed during the night. There was no incontinence of urine or faeces. He complained of deafness and of pain in the right ear at intervals.

On examination, the child was seen to be a pale boy with proptosis and puffiness of both eyes. The throat was normal. No abnormality was detected on examination of the heart, lungs or abdomen. Except for internal strabismus of the left eye, the nervous system was normal. Large swellings were present over both zygomatic processes and temporal regions. These swellings were not tender. X-ray examination of the skull revealed that the skull was large, with widening of the coronal suture; no other bony abnormality was demonstrated. X-ray examination of the chest, abdomen, spine and long bones revealed no abnormality. The haemoglobin value of the blood was 47%; the erythrocytes numbered 2,250,000 per cubic millimetre, and the leucocytes, 55,000 per cubic millimetre. The blood film was typical of leucemia, probably of the myeloid type, suggesting that the primary tumour was a chloroma. The urine was normal on microscopic examination. The blood urea content was 19 milligrammes per 100 cubic centimetres. Whilst he was in hospital, the child's condition was satisfactory, though he screamed intermittently with sudden headache. One day prior to the meeting a subconjunctival haemorrhage had occurred into the right eye, and another swelling had appeared over the left occipital area. Dr. Grieve said that he had not previously encountered a case of chloroma, though this diagnosis was not yet proved.

DR. HENRY SINN said that the case was interesting. Dr. Grieve had mentioned a similar case, which he (Dr. Sinn) had discussed at a clinical meeting two years ago. This child's illness began with spontaneous bruising of both upper eyelids, anaemia and headache. Although no tumour was palpable in the abdomen, Dr. Sinn had made the provisional diagnosis of neuroblastoma. The child was referred to the Children's Hospital for investigation. Soon after his admission to hospital, the child suffered from swellings of the salivary and lachrymal glands or Mikulicz's syndrome. Proptosis of the eyes began soon afterwards. Blood examination revealed what was regarded as a leucemic picture and the diagnosis was changed to chloroma. However, at the autopsy which Dr. Sinn himself performed, a tumour of the right suprarenal gland, perfectly encapsulated and spherical and about two inches in diameter, was found. The liver and the skull were riddled with metastases. It was a typical neuroblastoma. Dr. Sinn said that he had studied other cases of neuroblastoma in the hospital records, and had found that leucocytosis and the presence of immature cells in the circulation had been noted on more than one occasion. Therefore, though he was loath to cast the shadow of doubt over Dr. Grieve's hopes to find his first case of chloroma, Dr. Sinn thought that neuroblastoma and not chloroma was the diagnosis in this instance.

DR. H. DOUGLAS STEPHENS said that he had four months earlier examined a child whose left eye had become proptosed. The child had a large tumour, easily palpable, in the left upper quadrant of the abdomen, which was thought to be a neuroblastoma. Subsequently other swellings appeared in the skull. One of these was opened; the purulent-looking fluid which escaped was sterile. The child died two months later. This condition had been named "Pepper's syndrome" when the liver metastases predominated.

DR. ERIC PRICE said that he remembered another child who had been given many blood transfusions. This child had several swellings in the head, and the diagnosis of chloroma was made. At autopsy a large neuroblastoma that should have been palpable in life was discovered.

Dr. Grieve, in reply, said that chloroma was extraordinarily rare in Australia. The diagnosis was originally neuroblastoma, and the blood picture was thought to be the result of secondary deposits in the bone marrow. The child was quickly going downhill; the expectation of life was months only. The condition was usually met with in young children, most frequently aged between three and four years.

Correspondence.

COMPLICATIONS OF SULPHONAMIDE THERAPY.

SIR: In the discussion on the papers by Dr. Harris and Dr. Stephens (*THE MEDICAL JOURNAL OF AUSTRALIA*, June 30, 1945), Major Sturrock stated that sulphathiazole and sulphamerazine are the only sulphonamides which have "caused any bother" in the services. I am informed that there have been only two deaths in the army which could be ascribed directly to sulphonamides, and in neither case was either of these drugs used. Dr. Harris recorded several cases of urinary block from various sulphonamides, but stated that he had not used sulphamerazine. In your journal of July 14, Lieutenant-Colonel Wyndham publishes two cases of ureteric obstruction from crystals of sulphamerazine.

It would be very unfortunate if these remarks were accepted as proof of any special danger in the use of a very valuable drug, because sulphamerazine has been used largely in a great variety of conditions in the services with very great success, and many of the physicians concerned regard it as the most satisfactory member of the group which they have used.

All the sulphonamides are dangerous drugs and must be used with care and intelligence if trouble is to be avoided, but it is not fair to blame the drug where this is neglected. Unless enough fluid is taken to produce a urinary output of fifty ounces or thereabouts there is a danger of urinary tract complication with any of this group. It is obvious from some of the cases reported that this fact may be overlooked.

If the discussion produced by these papers serves to remind practitioners that they assume a considerable responsibility when they order a course of treatment with any sulphonamide, it will have done some good; but if it serves to discredit a valuable drug which is as safe as any member of the group when properly used, it will have done harm.

It is not out of place to mention that sulphamerazine should be given in dosages less than those of other members of the group. A circular to this effect has been sent recently to all civilian medical practitioners.

Yours, etc.,

ALAN NEWTON,
Chairman, Medical Equipment
Control Committee.

31, Albert Road,
Melbourne, S.C.2,
July 21, 1945.

University Intelligence.

THE UNIVERSITY OF MELBOURNE.

The following information is taken from the *University Gazette*, published by the Registrar for the Council of the University of Melbourne.

Dr. C. H. Dickson has been appointed lecturer in medical ethics.

Dr. R. C. Johnson, previously temporary evening lecturer in physics during the vacancy of the chair of physics, has been appointed evening lecturer in physics.

Professor H. S. Summers has been appointed for a further three months as assistant to the Vice-Chancellor on building matters.

Miss Lilian D. White has been appointed Margaret Catto Scholar and demonstrator in the department of zoology.

Air Vice-Marshal T. E. Victor Hurley, who has been on service leave for several years as head of the Royal Australian Air Force Medical Services, is to resume duties as Stewart Lecturer in Surgery on July 16. Wing Commander H. Searby, who has been acting Stewart Lecturer during the absence on leave of Air Vice-Marshal Hurley, has on the recommendation of the Faculty of Medicine been appointed as a member of the faculty as a clinical teacher.

On the recommendation of the Faculty of Medicine, Dr. Arthur Schuller, formerly Professor in the Faculty of Medicine of the University of Vienna, has been appointed honorary research officer in the department of anatomy, and will conduct research in neuroröntgenology.

Concessions for Discharged Servicemen.—The Faculty of Science has recommended that discharged servicemen and servicewomen would, on application, be exempted from the necessity of doing one of the first-year subjects of their course (provided that this was not a prerequisite for any

subject to be taken later in the course) and from the language requirements of the science course; but that all such students be strongly advised to do the full normal course if they could adequately cope with the work.

Russian in the Arts and Science Courses.—The Professorial Board considered a request submitted to it by the Council from the Standing Committee of Convocation that a reading course in Russian be introduced into the science course as an alternative to the reading course in French. After consultation with the Faculties of Arts and Science the Board resolved to recommend to the Council that Russian be introduced as a subject in the arts course, and as a voluntary reading course for science students, and that a lecturer in Russian be appointed.

Senior Lectureship in General Science and Scientific Method.—The Professorial Board has resolved to recommend to the Council that a senior lecturer be appointed to take charge of general science as a subject in the arts course, and to organize courses in scientific method for students in the science and medicine courses.

Research Funds.—On account of the acute shortage of funds for expenditure on research in the University of Melbourne, it was resolved early this year that major and minor research scholars should be appointed for a period of only four months, with no guarantee of further tenure. The Council has now resolved that to fail to reappoint these scholars for the remaining eight months of the research year would not only be most detrimental to research generally in the university, but would also make even more difficult the problems of teaching and demonstration to the larger classes that are expected in 1946 and later years. The Council has therefore reappointed for the remaining eight months the major and minor scholars appointed at the beginning of the year, and has made itself responsible for finding the necessary funds to finance this research programme.

Obituary.

JAMES FOX BARNARD.

We are indebted to Dr. Ronald A. Fairley, of Corowa, for the following appreciation of the late Dr. James Fox Barnard.

James Fox Barnard, who died at Corowa, New South Wales, on July 3, 1945, was born at Launceston, Tasmania, on July 13, 1874. He was the son of James Barnard, Collector of Customs at Hobart, Tasmania. At the age of eighteen, after distinguishing himself in the matriculation examinations of the University of Melbourne for the previous year, he was appointed a medical pupil at the Launceston Hospital, where he stayed eighteen months, finally entering Trinity College and later transferring to Ormond College at the University of Melbourne.

In his fourth year he took first-class honours in regional and applied anatomy, therapeutics, dietetics and hygiene, collecting two exhibitions. In his final year he took first-class honours in medicine, surgery, obstetrics and diseases of women, the Beane scholarship in surgery, pathology and forensic medicine, coming top of his year. During his course he was university champion of boxing for some years.

Among his contemporaries at the university were Mr. Basil Kilvington, Dr. Allen Robertson, the late T. L. Lambert, and the late J. F. McKeddie. At the Melbourne Hospital he became senior resident to the late Sir Thomas Fitzgerald.

During the Boer War he was commissioned as medical officer with the first Commonwealth contingent to leave Australia for South Africa. Upon his return to Australia he became a resident at Launceston General Hospital, and later went to Carr Villa to take charge of the smallpox hospital there. He married Sister M. Massey, who was the matron of this epidemic hospital. His wife and three daughters survive him. He then practised at Deniliquin, Wangaratta and later at Kerang. In 1915 he came to Corowa and took over the practice of Dr. W. H. Lang.

It has been my privilege to work in partnership with James Fox Barnard for the past eleven years, and during that time I have had ample opportunity to realize his marked ability. To this ability he added stability of character, absolute honesty and a tenacity of purpose where the good of his patients was concerned. His patients adored him, and revelled in his quaint sense of humour.

Even during his lifetime he became practically a legend throughout this large district, and many are the stories told of him—of his kindness, of his acts of charity and limitless generosity quietly performed wherever and whenever

needed. His humour was a delight and cheered all classes and conditions of his patients. Their faith in him was unbounded. He was intolerant of inefficiency or carelessness, but ever ready with a word of praise for a job well done.

Over the past thirty years many nurses have good reason to thank him for the soundness of the grounding he gave them during their training at the Corowa Hospital.

Of Sir Thomas Fitzgerald's manual dexterity he has often spoken, and the teacher transferred this to his pupil, for James Fox Barnard became a dexterous surgeon, with a reputation for soundness of diagnosis and a remarkable skill in surgery as well as in his obstetric practice. His knowledge advanced with the times and he was always most keen to use latest methods. He had been a member of the British Medical Association for many years.

A day's shooting with his sporting dogs and hours spent in his orchard gave him the relaxation he needed, for in thirty years in Corowa he took only three holidays. To me he has proved a true friend, a wise counsellor and a teacher beyond compare. Upon the foundation of wisdom which he laid down in his youth he has built "a superstructure of noble proportions perfect in all its parts".

DR. ALLEN ROBERTSON writes: The passing of Dr. James Fox Barnard, of Corowa, has removed one of the most likeable and capable men of the list of students of the late nineties.

It was my pleasure to have worked and read with him in those days. He came to Melbourne as a medical student after having served what might be termed a medical apprenticeship of about two years under the late Dr. Frank Drake at the Launceston General Hospital.

He had a very high opinion of the medical and surgical skill of Drake and frequently spoke of the value his association had been in that connexion. He thus came to Melbourne forearmed with much experience and acquaintance of methods and knowledge which showed him to great advantage in their application to the hospital ward work of a student. He was never ostentatious about it, but always quiet and retiring. He regarded Drake as a good mentor and his teachings of great value to him in his course, as results proved.

These, too, were carried by him in after-life into his practice. All his vacations were spent mostly in the Launceston Hospital with Drake, and the further along the path to qualifying he went, the more impressed he became with Drake and imported into his practice the technique and methods he learnt from him.

Others have supplied contributions which narrate his good work in several spheres during his transition to settling in Corowa and of his work there and his kindness to all which will ever be remembered. "The profession is all the better for its Barnards."

DR. ADRIAN KENNEDY writes: The medical profession and the people of Corowa and district whom he attended so thoughtfully and kindly have suffered an irreparable loss by the death of Dr. James Fox Barnard.

In my early years of practice I was indeed fortunate to be associated with two outstanding medical men—Dr. Barnard, of Corowa, and Dr. J. W. Florance, of Mooroopna. They were both skilled country practitioners, beloved by the people amongst whom they toiled and "grand old men of the profession". Now unfortunately both these links in my life chain have been broken.

Dr. Barnard was beloved by all classes, rich and poor, and was most sympathetic, patient and unselfish in his efforts to accommodate the practitioner who was starting on his career. My association with him at the Corowa Hospital was indeed a very happy one, the memories of which I hope to cherish always. His remarks at the completion of operations were most encouraging and filled the young inexperienced surgeon with unbounding zeal and confidence. His extensive practice was the reward of his meticulous diagnosis and judgement in medical, surgical and obstetrical cases, for he was remarkable for his knowledge of all subjects. Even to the end he read extensively and applied new methods and new drugs to his vast armamentarium and truly advanced with the times. His exactness and discrimination between conservative and radical treatment were superb and he was eagerly sought by his colleagues as a reliable consultant.

The medical profession has lost a dear and loyal friend—a true disciple of Hippocrates—and wise counsellor. The grief felt by his sorrowing wife and daughters must be lessened somewhat by the loving and lasting tributes paid him by his patients and friends when they realized they would no longer have "the dear old doctor" to attend them in their sufferings.

MATTHEW KASNER MOSS.

THE following appreciation of the late Dr. Matthew Kasner Moss has been sent from Western Australia with the approval of the Council of the Western Australian Branch of the British Medical Association.

Matthew Kasner Moss qualified in Melbourne in 1902. After some years of hospital work and private practice in Echuca, he came to Perth. He was a big powerful man in his prime, excelling in boxing and rowing, and had the distinction of rowing in winning interstate crews for both Victoria and Western Australia. He maintained interest in all sports, especially racing, throughout his life. He remained in general practice, though he was honorary surgeon to the Perth Hospital for many years. He was particularly interested in anaesthesia and was never so happy as when designing apparatus for intratracheal administration. It was for his British Medical Association activities that his place will be hard to fill. For years he was a member of the Council of the Western Australia Branch and had occupied the presidential chair. He was again appointed to that office last year, but was forced to resign because of ill health. He was a member of the Branch committee which acted in an honorary capacity in disputes between members and insurance companies. Later he was one of two medical members of the statutory body which, presided over by a judge of the Supreme Court, hears charges and passes judgement on doctors charged with breaches of the *Workers' Compensation Act*. He was a very active member of the contract practice committee of this State and of the Federal Council. He had a sound mind in a sound body. His conscience was clear as crystal and never went back on him as it sometimes does on men whose mental vision was less clear than his. Absolute independence was the controlling feature of his life. He was not without a large share of self-assertion, and yet he was the most unselfish of men. By nature he was warm-hearted and magnanimous. He honoured and magnified his profession. Mattie Moss will be long and affectionately remembered not only by his colleagues, but by a host of patients taken from every walk of life to whom he was truly their "family doctor".

DR. GILBERT TROUP, President of the Australian Society of Anaesthetists, writes: With the passing of Matthew Kasner Moss, Australian anaesthetists have lost a valued member. He had many medical interests, but his greatest was anaesthesia. Recently he decided to give up all his other work except anaesthetics. It was the irony of fate that struck him down in his last illness only a few weeks after he commenced the sole practice of his choosing.

Mattie Moss was the father of modern anaesthesia in Western Australia. He introduced the endotracheal technique to the State and he was in the forefront in adopting every new and tried advance as it came along. He retained, over the years, that elasticity of mind and judgement that allowed him to assess and adopt that which was of value. To the younger practitioners, keen on the art of anaesthesia, he was a good friend and instigator of enthusiasm. His was a generous nature that welcomed and encouraged keenness of others in a branch of which he was the acknowledged leader. It is with sorrow that we part from him, but the stamp of his work remains and will live for many years to come.

CAPTAIN M. KELLY, A.A.M.C., writes: The death of Matthew Kasner Moss has removed a lovable personality from the medical world of Perth. Of him it is no cliché to say that he endeared himself to all who knew him, for it is the truth. Samuel Johnson is said to have remarked of Dr. Mead, the famous court physician of the eighteenth century, that he knew of no other man so inclined towards the sunny side of life. The same was true of "Mattie" Moss, with his kindly disposition so ready to light up with a merry quip and the genuine friendly interest he was wont to display in all whom he met. This was particularly encouraging to younger medical men, with whom on all occasions he was ready to pass a familiar word on terms of absolute equality.

With all his love of fun and merriment, Dr. Moss throughout his thirty-nine years of practice in Perth was a serious and industrious labourer in many vineyards. For many years he was the backbone of the Western Australian Branch of the British Medical Association, and for three separate terms he occupied the presidential chair. He was a fighter, too, and showed great readiness to take up the cudgels when it was necessary to defend the vital interests of the profession. His reputation as a man of high principle brought him honour both from the profession and the laity; and, because of the high respect in which his name was held by all, he was much sought after as the representative of the profession on a large number of semi-medical com-

mittees and boards. He was carried off by the "doctor's disease" at the age of sixty-six, and his passing leaves a gap which cannot be filled.

GEOFFREY FREDERICK BECK.

We regret to announce the death of Dr. Geoffrey Frederick Beck, which occurred on July 21, 1945, at Geelong, Victoria.

Naval, Military and Air Force.

CASUALTIES.

ACCORDING to the casualty list received on July 25, 1945, Lieutenant-Colonel A. H. Powell, A.A.M.C., Armidale, New South Wales, has been placed on the "seriously ill" list.

According to the casualty list received on July 25, 1945, Captain O. U. Williams, A.A.M.C., Killara, New South Wales, is reported as "killed in action".

According to the casualty list received on July 26, 1945, Captain R. J. Ailsopp, Wollongong, New South Wales, previously reported as having died of wounds, is now reported "killed in action".

According to the casualty list received on July 26, 1945, Lieutenant-Colonel R. J. Humphrey, Neutral Bay, New South Wales, previously reported as "dangerously ill", is now reported to have died of injuries accidentally received.

Australian Medical Board Proceedings.

TASMANIA.

THE undermentioned has been registered, pursuant to the provisions of the *Medical Act, 1918*, of Tasmania, as a duly qualified medical practitioner:

Abbott, Nigel Drury Gresley, M.B., B.S., 1944 (Univ. Adelaide), 9, Stoke Street, Hobart.

Medical Appointments.

Dr. John Charles Squires has been appointed Government Medical Officer at Hughenden, Queensland.

Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

MacMillan, Kenneth Charles, provisional registration, 1945 (Univ. Sydney), Sydney Hospital, Sydney.

Books Received.

"Midwifery: Principles and Practice for Pupil Midwives, Teacher Midwives and Obstetric Dressers", by R. Christie Brown, M.B., M.S., F.R.C.S., F.R.C.O.G., and Barton Gilbert, B.Sc., M.D., F.R.C.S., M.R.C.O.G., with Infants' Section by Richard H. Dobbs, M.D., M.R.C.P.; Second Edition; 1945. London: Edward Arnold and Company. 5" x 7", pp. 843, with many illustrations. Price: 15s. net.

"Birth-Control Methods (Contraception, Abortion, Sterilization)", by Norman Haire, Ch.M., M.B., with a foreword by Aldous Huxley; First Australian Edition; 1945. Sydney: Australasian Publishing Company, Proprietary, Limited. 7½" x 5", pp. 44, with 14 diagrams and 16 plates. Price: 7s. 6d.

"Aids to Fevers for Nurses", by Joyce M. Watson, S.R.N., S.R.F.N., D.N. (Lond.), with foreword by H. Stanley Banks, M.A., M.D., M.R.C.P., D.P.H., Second Edition, 1945. London: Baillière, Tindall and Cox. 6½" x 4½", pp. 373, with many illustrations. Price: 4s.

"Essentials of Local Anæsthesia in Dentistry", by Arthur Cornford Bowden, H.D.D. (Edinburgh), L.D.S. (England); 1945. Bristol: John Wright and Sons Limited. 7½" x 4½", pp. 60, with many illustrations. Price: 6s. net.

"Synopsis of Surgery", by Hey Groves, edited by Cecil P. G. Wakeley, C.B., D.Sc., F.R.C.S., F.R.S.E., F.A.C.S., F.R.A.C.S.; Twelfth Edition; 1945. Bristol: John Wright and Sons Limited. 7½" x 5", pp. 640, with many illustrations. Price: 25s. net.

Diary for the Month.

- AUG. 7.—New South Wales Branch, B.M.A.: Organization and Science Committee.
 AUG. 10.—Queensland Branch, B.M.A.: Council Meeting.
 AUG. 13.—Victorian Branch, B.M.A.: Hospital Subcommittee.
 AUG. 13.—Victorian Branch, B.M.A.: Finance, House and Library Subcommittee.
 AUG. 14.—Tasmanian Branch, B.M.A.: Ordinary Meeting.
 AUG. 14.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
 AUG. 14.—Victorian Branch, B.M.A.: Organization Subcommittee.
 AUG. 15.—Western Australian Branch, B.M.A.: General Meeting.
 AUG. 16.—Victorian Branch, B.M.A.: Executive Committee.
 AUG. 16.—South Australian Branch, B.M.A.: Council Meeting.
 AUG. 21.—New South Wales Branch, B.M.A.: Medical Politics Committee.
 AUG. 22.—Victorian Branch, B.M.A.: Council Meeting.
 AUG. 23.—New South Wales Branch, B.M.A.: Clinical Meeting.
 AUG. 24.—Queensland Branch, B.M.A.: Council Meeting.
 AUG. 28.—New South Wales Branch, B.M.A.: Ethics Committee.
 AUG. 30.—New South Wales Branch, B.M.A.: Branch Meeting.
 SEPT. 4.—New South Wales Branch, B.M.A.: Organization and Science Committee.
 SEPT. 5.—Western Australian Branch, B.M.A.: Council Meeting.
 SEPT. 5.—Victorian Branch, B.M.A.: Branch Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phoenix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract practice appointments in Western Australia. All Public Health Department appointments.

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